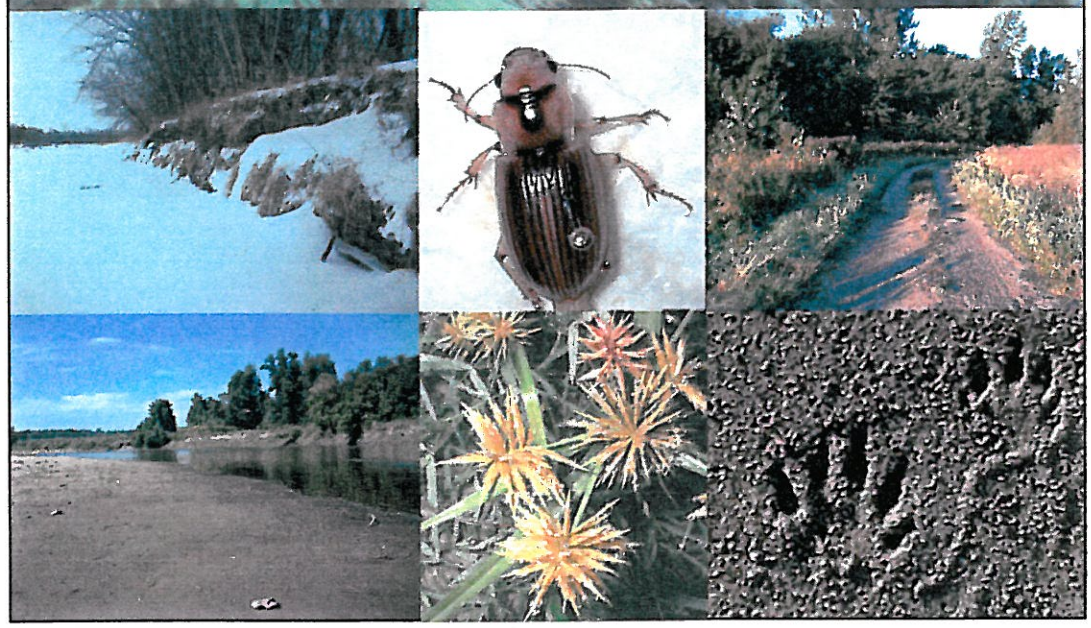
Burlington Parks + Rec
863-0420

# McKenzie Property
# Inventory, Assessment & Management Plan

**Prepared by the Winooski Valley Park District**

**For the City of Burlington Department of Parks and Recreation**



April 2003

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With assistance from Alicia Daniel, Elizabeth Thompson
and the staff at the Winooski Valley Park District

Cover photos: Brian Carlson
Background: Floodplain forest with silver maple trees and ostrich ferns
Clockwise from top left: Steep river shore along downstream from sandy shoreline, *Geopinus* beetle from the sandy shoreline, Intervale Bike path along west side of property, Mink tracks, *Cyperus strigosus* from the sandy shoreline, Lowest portions of the sandy shoreline.

The Winooski Valley Park District is a partnership between Burlington, Colchester, Essex, Jericho, South Burlington, Williston, and Winooski created to preserve urban natural areas for the purposes of wildlife conservation, education, and passive recreation.

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Note:
This document uses superscript numerals in the text to cite references located at the end of the document.

## ACKNOWLEDGMENTS

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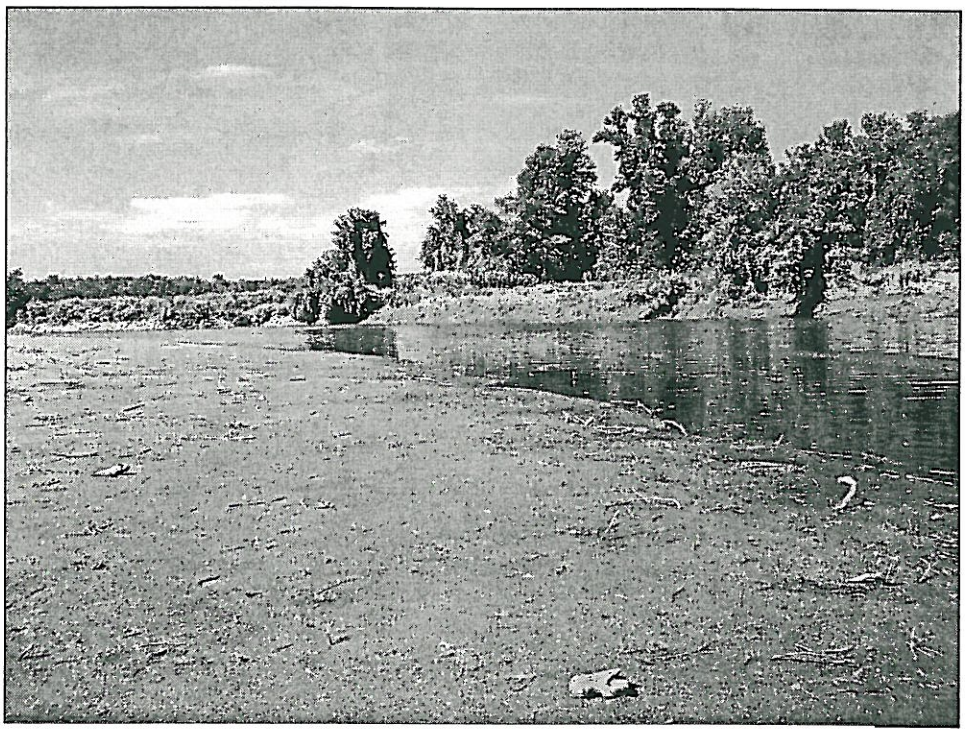
The following document was used as an excellent guide in the development of this plan: Erdle, S. Y. 1999. Resource Management Plan for Grandview Nature Preserve. Natural Heritage Technical Report # 99-13. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA.



Exposed river shore during the low water period of late summer 2002.
photo: B. Carlson

## EXECUTIVE SUMMARY

The 63 acre McKenzie property is a mix of floodplain forest and farm fields adjacent to the Winooski River in the Burlington Intervale. The property is owned and managed by the City of Burlington's Parks and Recreation Department. This property is designated as an "Urban Wild" – a new land category introduced as part of the Conservation Legacy Program in 2002. This category applies to City properties that "provide habitat for rare and endangered plant and animal communities, wetlands and other riparian systems, floodplain, unique geological and hydrological features, important wildlife habitat and travel corridors, areas important for scientific research and education, scenic vistas, trails, passive recreation, sustainable forest communities, and cultural features."

This management plan was developed as part of the Burlington Conservation Legacy Program to guide future stewardship of the property and to provide a framework for future management plans for other Urban Wilds owned by the City.

The McKenzie property fits many of the criteria of an Urban Wild. It provides habitat for six species of rare plants and it contains approximately 24 acres of floodplain forest which is a wetland and provides important wildlife habitat. A portion of the river shore of the property is a beach which is one of the largest examples of an undisturbed river sand shore natural community in the entire state. It has an enormous diversity of plant species, many of which are rare in Vermont. The beach provides hunting areas for mink, habitat for a large number of insects and potential nesting habitat for turtles. The property also contains two trails – the Intervale bike path which passes through the agricultural fields, and a narrower path that winds through the forested portion of the property.

Active management of the property is necessary to ensure that the unique ecological values of the property are not lost. This document provides many management recommendations to protect these ecological values and to increase the public's awareness and appreciation of the property. The highest priority recommendations are summarized below.

The beach should be managed for minimal use during the growing season (beginning of May through the end of October). It should certainly never be promoted as a public river access or beach area. Use levels need to be monitored since the use of the Intervale Bike Path is expected to continue to increase as the population of the region continues to increase.

Initiate a control program for the invasive plant Japanese Knotweed in the floodplain forest. This plant is threatening to displace the native plant species found in this forest. The numerous old appliances and vehicles scattered through the forest should be removed.

Install trail and boundary signs that educate visitors that the property is a City-owned natural area. Also work with the Intervale Foundation to initiate a shoreline tree-planting effort along the portion of the property's shoreline that has no forest separating the river from the open fields.

# INTRODUCTION

The 63 acre McKenzie property is a mix of floodplain forest, sandy river shore, and farm fields adjacent to the Winooski River in the Burlington Intervale. The property is owned and managed by the City of Burlington's Parks and Recreation Department. This management plan was developed as part of the Burlington Conservation Legacy Program to guide future stewardship of the property and to provide a framework for future management plans for other natural areas owned by the City.

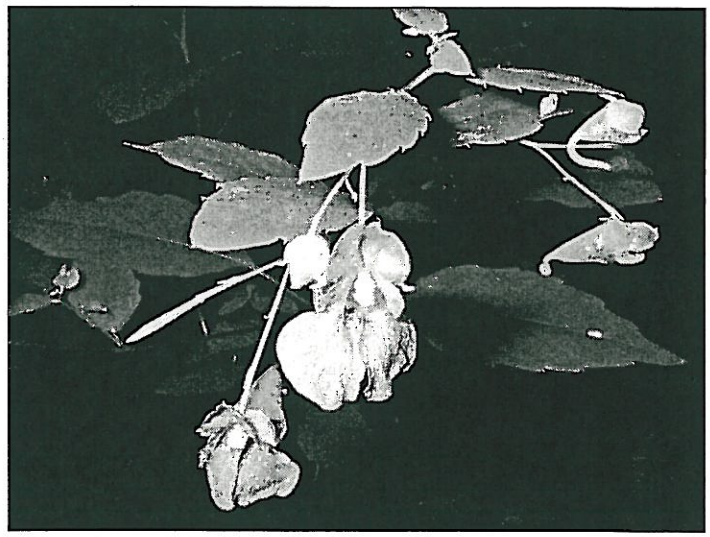
## Conservation Legacy Program

In October 2000, the Burlington City Council adopted the 2000 Burlington Open Space Protection Plan. Following the recommendations of this plan, the Burlington Conservation Legacy Program was created.[1] One responsibility of this program is to develop management plans for unique natural areas within the Burlington Parks System.

## Urban Wilds

A new land category known as "Urban Wilds" was introduced as part of the Conservation Legacy Program in 2002.[2] This category applies to City properties that "provide habitat for rare and endangered plant and animal communities, wetlands and other riparian systems, floodplain, unique geological and hydrological features, important wildlife habitat and travel corridors, areas important for scientific research and education, scenic vistas, trails, passive recreation, sustainable forest communities, and cultural features."[3]

The proposed management goals for Urban Wilds lands are: (1) to preserve the natural features that make those lands unique; (2) to encourage compatible and appropriate levels of passive recreation; (3) to conserve the areas for the benefit of future generations.



Jewelweed (*Impatiens capensis*) in the floodplain forest.
photo: B. Carlson

## MCKENZIE PROPERTY DESCRIPTION

### Location

The McKenzie property is located in the part of the City of Burlington known as the Intervale (see Figure 1). The word "intervale" is a term that refers to the land between hills or mountains. In this case it is used to refer to the flat expanse of land in both Burlington and Colchester along the Winooski River beginning at Salmon Hole in Winooski and extending to the mouth of the river. The Intervale Bike Path passes through the southern end of this property, connecting the Ethan Allen Homestead Park with Intervale Road. The only access to the property is via the Intervale Bike Path, or via the Winooski River. Visitors can park their vehicles either at the parking area at the end of Intervale Road or the parking area on the road leading to the Ethan Allen Homestead. From either of these parking areas, the McKenzie property is a little more than ½ mile away – to the north when coming from Intervale Road, or to the east when coming from Ethan Allen Homestead.

### Boundaries

The 63 acre McKenzie property consists of fields and floodplain forest. The property is bounded on the north and east by the Winooski River, on the west by a farm field owned by Pat Fitzgerald and forest land owned by the Winooski Valley Park District, and on the south and southeast by farmland leased by the Intervale Foundation and owned by the Calkin family (see Figure 2).

### Present Facilities

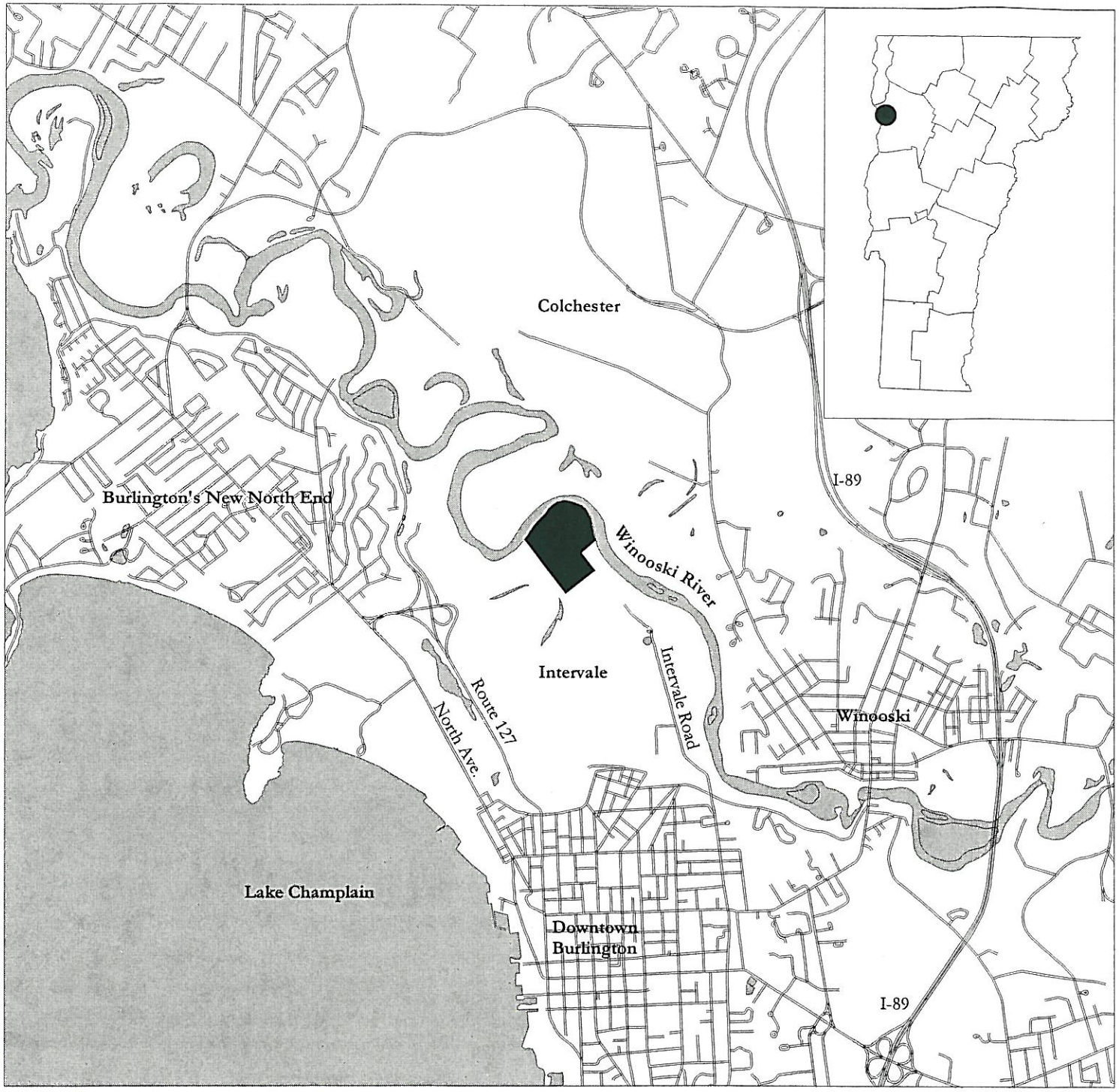
The popular Intervale Bike Path that connects Intervale Road with the Ethan Allen Homestead crosses through the fields of the McKenzie Property. A narrow footpath branches off from the bike path, winding through the floodplain forest near the Winooski River shoreline. Portions of both trails are submerged in spring when the Winooski River rises over its banks. Currently, no signs exist on the property that indicate it is owned by the City of Burlington, nor are there signs that indicate any trail use guidelines or where the trails lead or how long they are. The only structures on the property are utility poles that cross through the fields.

### Surrounding Land Use

The property is located in the midst of agricultural land. The adjacent farmland is used for growing vegetables, growing silage corn, and raising chickens. There are also small patches of floodplain forest in the area, mostly confined to the lowest elevations and narrow bands that separate the fields.

### Regional Population Demographics

The City of Burlington is the state's most populous city with 39,824 inhabitants. The City is the economic center of Chittenden County (pop. 146,571). The population of the City has increased slightly in recent years, roughly 1.6% per year. However, the population of the County is growing rapidly, with 11.24% growth from 1999-2000, and a 96% increase between 1960 and 2000![4] With this large population increase in the region, the value of easily accessible, undeveloped natural areas continues to grow.




# Figure 1. Location Map

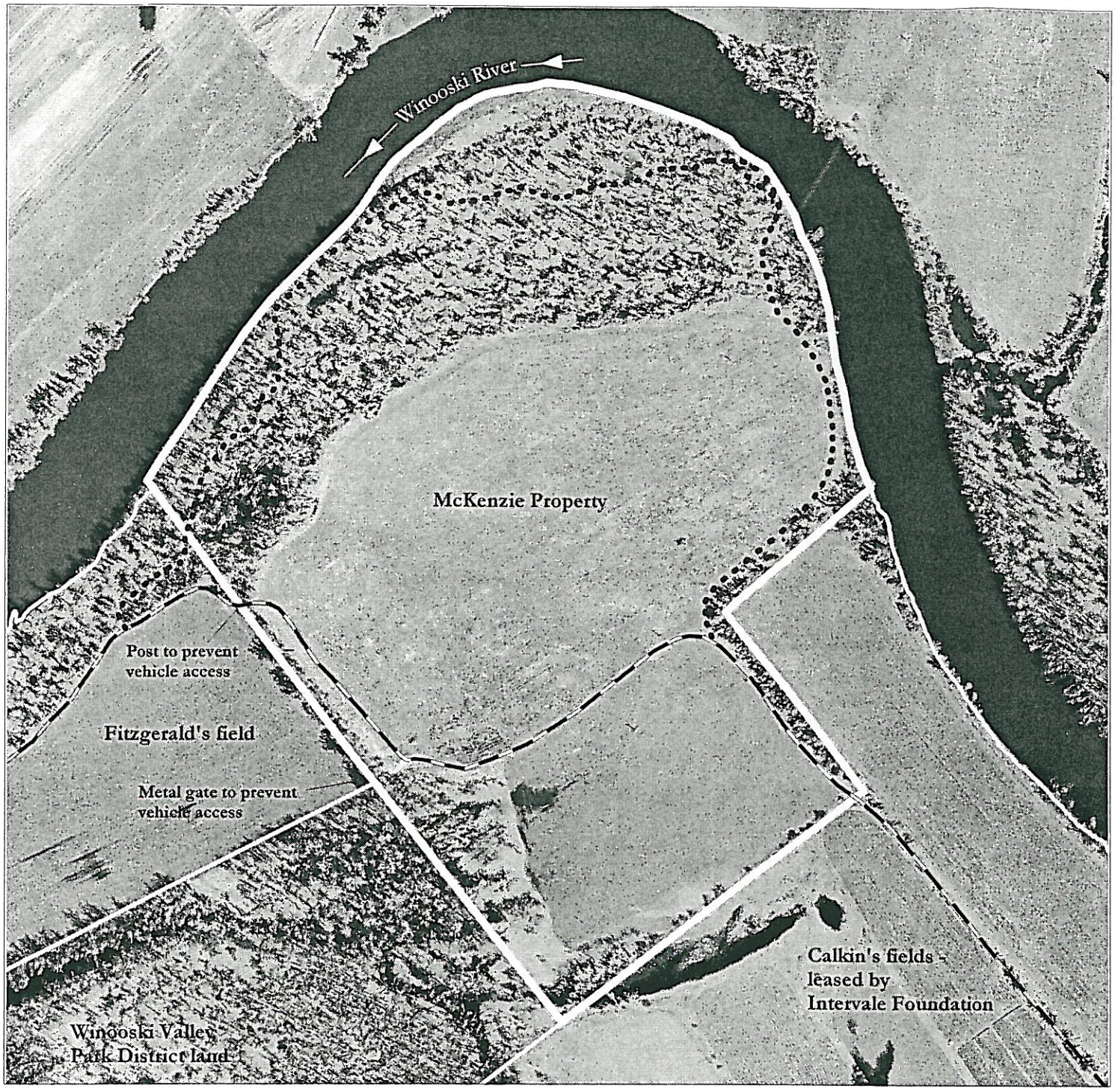
Legend

McKenzie Property

0.5 0 0.5 Miles

Map produced March 2003

Winooski Valley Park District




## Figure 2. Property Boundary and Trails

Legend

Trails
bike path
side trail
Mckenzie Property Boundaries
Burlington Tax Map Parcels

100 0 100 200 Feet

Digital Orthophoto scale: 1:1250, date: 2000
Trail locations are estimated to be accurate within 50 feet.
Map produced March 2003

Winooski Valley Park District

## Socioeconomic Context of Property

This property provides a natural area for the entire population of Burlington and surrounding communities. There are no fees to access the property and it is within city limits. The property is accessible by anyone with a bicycle or on foot.

The Intervale in general is a destination for homeless people in the Burlington area. Interestingly, this is a trend that began in the 1800s and continues today.[5] Many homeless people set up camp throughout the summer months in the Intervale. This became a controversial issue in May 2002 when the establishment of an 'authorized' camp area was proposed by some City employees for the McKenzie property.[6] This camp area was eventually rejected by the City because of issues including liability, sanitation, and laws against camping in undesignated areas. During site visits in September 2002 there was no evidence of active camps on the property.

## Area History

### General land use history

The nutrient-rich soils of the Intervale are excellent for agricultural uses. For this reason the Intervale has been extremely valuable for the human inhabitants of the region for thousands of years. The best estimate for the date of earliest human inhabitants of the Intervale is 10,000 years ago.[7] The oldest archeological site in the area (located less than 1 mile away on the Ethan Allen Homestead property) dates from the late Archaic period, about 4,000 years ago.[8] Today, while agriculture is still an important use of the Intervale, the area also serves an important role as open space for the residents of the area.

In 1772, much of the Intervale was forested. Ira and Ethan Allen bought up large pieces of land in the area and within 20 years much of the floodplain forest was cleared for agricultural use.[9] Extensive clearing of forests in the Winooski River watershed combined with poor farming practices in the 1800s caused tremendous amounts of erosion to occur upstream. The forest clearing also led to higher flood levels. The higher volumes of water along with the sediments in the river increased the power of the river to carve into the river banks in the Intervale. Although the river channel naturally changes course over time, these extra sediments and higher flows caused the river channel to change dramatically in the 1800s.[10] The aerial photo on the right shows the estimated location of the river channel in 1802, compared with the current river channel in 2000.[11] By this estimate, the river channel appears to have moved as much as 1000 feet over the past 200 years, shifting most of the McKenzie peninsula from the Colchester side of the river to its current location! Most of the movement, however, occurred in the period from 1802 to 1894. Since that time the river channel has been relatively stable in comparison, although it is always in a state of change.

Aerial photo of the current Winooski River channel (2000), with the approximate 1802 channel position shown as the narrow gray band.

1937 aerial photographs of the area reveal that the present forested area was also present at that time. This suggests that some of the trees may be approaching 100 years of age. A tree core of one 27 inch diameter silver maple tree within

100 feet of the river shore indicated an approximate age of 80-100 years. The only larger trees in the forest are cottonwoods, a species that characteristically grows extremely quickly and seldom lives past 125 years. Remains of several channels dug into the ground are found in the forest, presumably to help the area drain flood waters more quickly. Based on the age (55 years) estimated from a core of a 17-inch diameter silver maple growing in one of these ditches, the ditches have not been maintained since the 1950s.

### Acquisition history

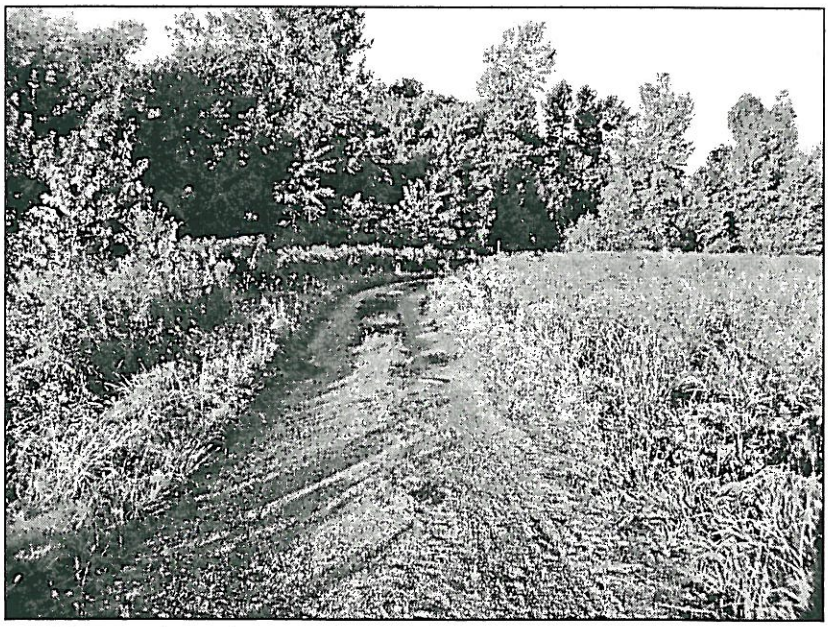
The following timeline traces the ownership of the McKenzie property back to the early 1900s. The volume and page numbers refer to the City of Burlington land records on file at the City Clerks office in City Hall.

1915: Property (two separate parcels) conveyed from the Estate of Harry R. Thomas to Lucius A. Bostwick. (Vol 67, p. 215 and Vol 59, p. 508)

1918: Property conveyed from Lucius A. Bostwick to Edward P. Bostwick. (Vol 70, p. 161)

1953: Property conveyed from the Estate of Edward P. Bostwick to John McKenzie Packing Co. Inc. (Vol 140, p. 399)

1980: Property conveyed from John McKenzie Packing Co., Inc. to City of Burlington. (Vol 272, p. 491)



Looking north on the Intervale Bike Path on the west edge of the McKenzie property. photo: B. Carlson

## RESOURCES OF THE MCKENZIE PROPERTY

A variety of methods were used to gather information about the resources of the property during the period from September 2002 – March 2003. These methods included a plant species inventory, natural community assessments, wildlife tracking, literature searches, interviews with adjacent landowners and property users, and consultation with regional experts in various natural resource fields. While the vascular plant inventory was quite thorough, it was performed late in the growing season. More species may be found during the spring and early summer months. Recommended future work includes more bird, invertebrate, fungi, and bryophyte inventories since these subjects were not thoroughly covered by the information gathering for this report.

### Physical Description

#### Topography

The property is nearly flat, with an elevation of 105 feet above sea level. Throughout much of the forested area there is a natural levee, or berm, along the edge of the forest closest to the river. This typical floodplain formation results from floodwaters depositing sediment along the shore year after year until it builds up higher than the surrounding land. Some channels cut into this berm, perpendicular to the river. Presumably these channels were excavated by farmers many years ago to help drain the land after spring high water. Along the river shore, the topography varies greatly. One area descends gradually from the forest to a broad sandy shoreline, while at other areas the forest drops abruptly as much as 10 feet to the river (see photo at right).

Steep river shore along the northwest edge of the property. photo: B. Carlson

#### Geology

The bedrock that underlies the property is a calcium-rich rock known as Dunham Dolomite.[12] However, the bedrock is deeply buried under thousands of years of post-glacial and alluvial deposits and does not play a role in the soil composition at this site, except as it is reflected in outwash sediments from further upstream. On this site the surficial geology is of primary importance. Alluvial surface deposits 9 ½ feet deep have been dated to the mid-1800s when forest clearing peaked in Vermont and major flood events carried topsoil from the Green Mountains downstream.[13] These deposits are rich in nutrients that help make the soils extremely productive.

#### Soils

The soils on the property are classified within the Limerick-Hadley-Winooski association – an association of three different soil types typically found together in floodplains in the region. These are loamy soils that are subject to flooding. Most have been cleared for agricultural use. In contrast to many upland soils in the region, these soil types generally do not display distinct color differences between soil layers when examined in cross-

section. This lack of visibly distinct colors is due to the fact that they are young soils and it takes many decades for the layers to develop distinct colors. [14]

Limerick soils are found in the lowest depressions of the floodplain and therefore flood the most frequently. Winooski soils also flood frequently, but they generally occupy areas slightly higher than the Limerick soils. The highest areas of the floodplain are occupied by Hadley soils.

Each of these three soil types is so frequently flooded as to be unsuitable for any type of permanent buildings or roads.

### Hydrology

The ecology of this property is closely tied to the Winooski River and its hydrology. The amount of flow in the Winooski River fluctuates significantly throughout the year. In general the highest flows are in the spring, due to spring rains and melting of the mountain snow. The lowest flows tend to be in late summer. Based on mean monthly flows calculated from 73 years of monitoring, April has by far the highest mean flow (over 5,000 cubic feet per second), with the lowest months being July, August, and September, each with between 700-800 cubic feet per second.[15] Of course this pattern varies from year to year, depending upon the timing of rainfall. The timing and extent of ice on the river also varies each winter. In some years open water persists in pockets throughout the winter, but in cold winters like that of 2002-2003 the surface freezes solid for most of the winter.

Neither the Winooski One Hydro Dam in Winooski, nor the Green Mountain Power (GMP) Dams in Essex appears to significantly change the effects of the river on this property. The Winooski One Dam does not impound water, so it does not affect flow this far downstream. The GMP Dams maintain a minimum flow during the summer, and they cannot impound large amounts of water for long periods of time. For example, in a flood event, they may be able to pond some water for a day, but that surge will eventually lead to increased flows downstream.[16] So, the overall pattern of flood events that bring new sediments to the property, and the low flow periods that expose the sand beach of the property, continue despite the presence of the dams. One possible effect of the dams may be that they trap some sediments, reducing the overall amount of sediment reaching the McKenzie property. However, further study would be needed to determine the magnitude and consequences of this potential effect.

### Climate

Burlington (as measured at the Burlington International Airport) has a temperate climate with the mean maximum temperature in July of 80.7°F and mean maximum temperature in January of 25.5°F. The mean annual precipitation in Burlington is 34.4 inches, with a mean snowfall of 81.0 inches. Average annual windspeed in Burlington is 9.6 mph. [17] These values probably generally apply to the McKenzie property.

## Current Value in Landscape Context

In general the entire Intervale provides important habitat for wildlife because it is such a large area (3900 acres[18]) with very few houses or roads. Large mammals documented from the Intervale during winter tracking surveys since 1995 include moose, deer, black bear, river otter, fisher, mink, red fox, coyote, beaver, raccoons, and skunks. The McKenzie property,

while only a small piece of The Intervale, is especially important because it has a relatively large patch of floodplain forest. This forest is also contiguous with a forested buffer along the river downstream from the property, so it provides a corridor for the movement of wildlife. This use of this property as a corridor was supported by results of winter 2003 tracking surveys that found a higher density of large mammal tracks in the forest compared with the open fields. There are also narrow forested bands separating the property from adjacent properties. While these pieces of forest are not especially large, they do provide a corridor for the passage of wildlife species that tend to avoid crossing large open spaces.

## Natural Communities

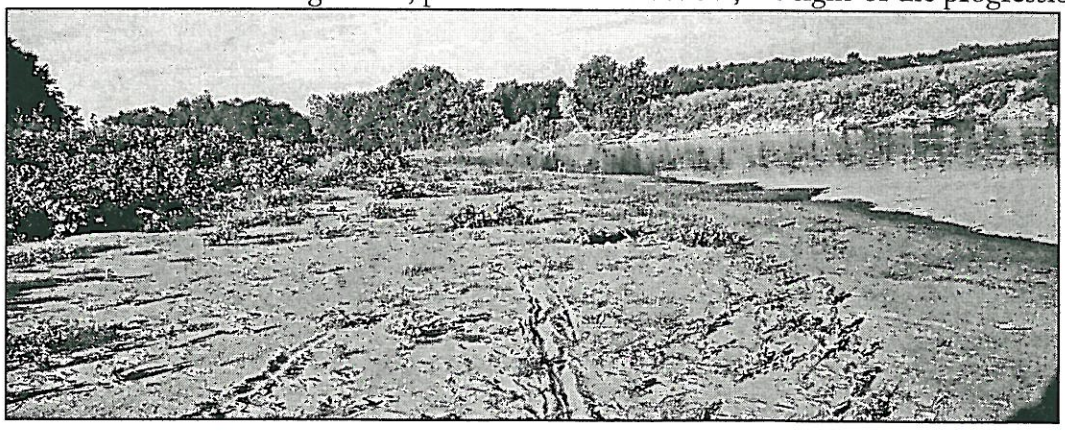
One way to describe and classify a natural area is to identify its natural communities. Understanding an area's natural communities helps us to understand patterns in the land and helps us with the management of that land. In this document the natural community types are drawn from the book "Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont."[19] Figure 3 illustrates the boundaries of the different natural communities on the McKenzie property. See Appendix I for color photos of some of these natural communities.

### River beach complex (1.5 acres)

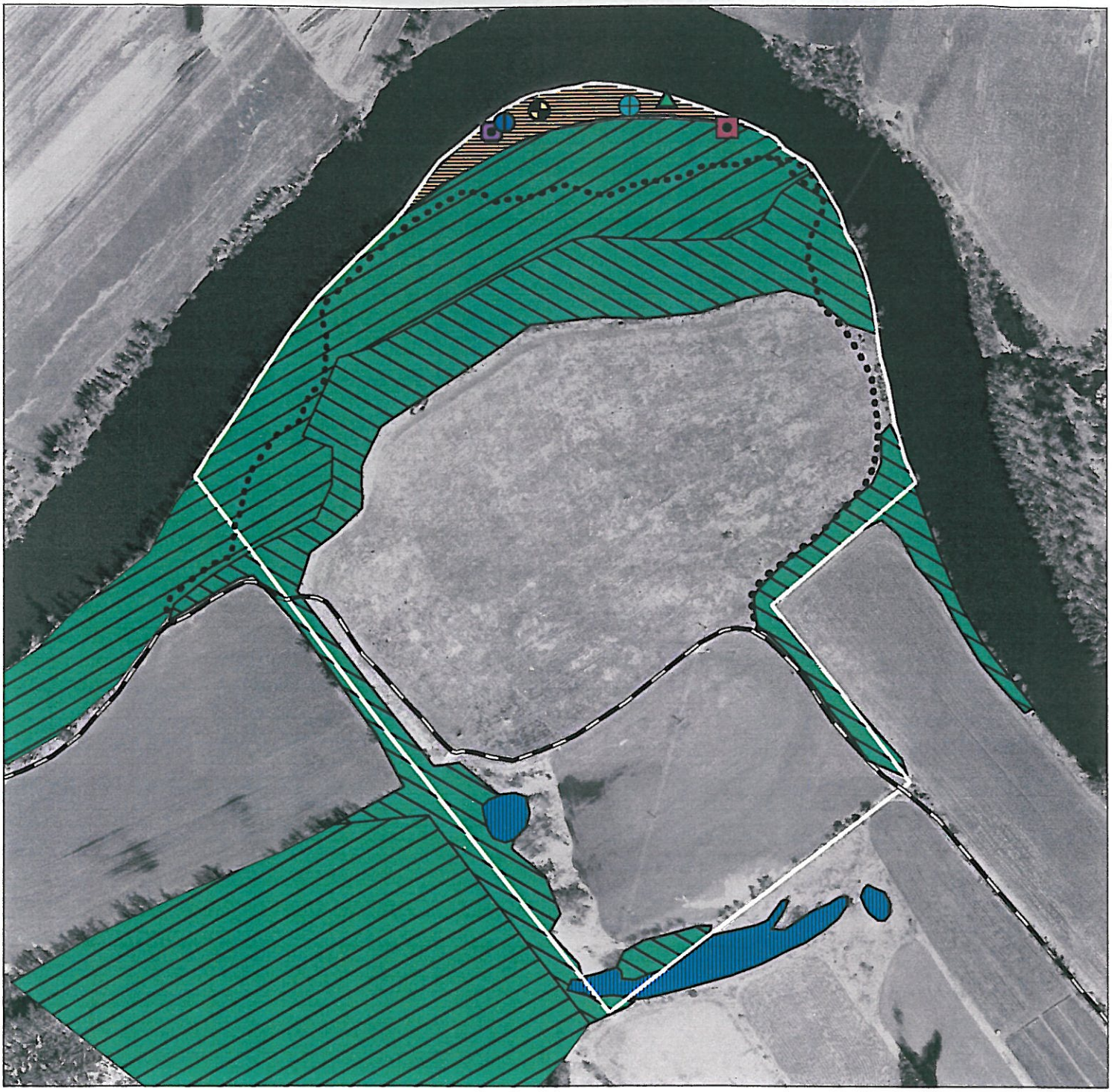
This area is actually a mix of three natural communities that lack distinct boundaries. The uppermost area is river shore grassland that grades into river sand shore which grades into river mud shore at the lowest elevations of the upstream end of this complex.

This beach is one of the largest examples of an undisturbed river sand shore natural community in the entire state.[20] It has an enormous diversity of plant species, many of which are rare in Vermont. Large numbers of insects are found on the beach, including abundant ground beetles. The beach also provides potential nesting habitat for turtles, and hunting areas for mink. The beach is relatively undisturbed by human use, but it is used during the summer months by occasional anglers or people walking their dogs.

This unique community is maintained by fluctuations in the flow of the Winooski River. Each year the high water and ice scour combine to prevent the forest from spreading onto the sandy shoreline. The only plants that can establish themselves are small annual plants that start from seed each year after the water level has dropped and exposed the sand. Linear bands of vegetation, parallel to the river shore, are signs of the progression



The river sand shore, with the zones of shrubs and cocklebur on the upper left side of the photo. Photo: B. Carlson



## Figure 3. Natural Communities and Rare Plants

Legend

Mckenzie property

Trails
- bike path
- side trail

Natural communities
- open wetland
- river beach complex
- mature floodplain forest
- early succesional floodplain forest

Unshaded regions are agricultural fields

Rare plant species
- Awned cyperus
- Ovate spikerush
- Creeping lovegrass
- Redtop panicum
- Sandbar willow
- Carpenter's square

100 0 100 200 Feet

Digital Orthophoto scale: 1:1250, date: 2000
Natural Community boundaries are based on field visits and aerial photographs.
Trail locations are estimated to be accurate within 50 feet.
Map produced March 2003

Winooski Valley Park District

of vegetation along with the receding water. At the upper edge of the beach, out of the reach of the ice scour, there is a band of shrubs including the rare sandbar willow (*Salix exigua*). Just below and mixed with these shrubs is a zone dominated by dense thickets of the unique plant common cocklebur (*Xanthium strumarium*). Below this zone, the vegetation is mostly patches of small annual grasses and sedges.

The greatest threat to this community is overuse. Abundant foot traffic or use of this area as a 'blanket beach' or as a popular biking area would destroy the small annual plants, discourage turtles from nesting on the beach, and disrupt the many insects, such as tiger beetles, that complete their entire life cycles on the beach. Refer to page 14 for a more detailed discussion of this threat.

**Floodplain forest** (24.5 acres on city property, total of 30 acres)
The forest that covers a large portion of this property is a mix of silver maple-ostrich fern and silver maple-sensitive fern floodplain forest types. A few acres of this forest occur as narrow bands of trees that form the boundary between adjacent properties. Floodplain forests are considered forested wetlands, and a portion of the forest appears on National Wetland Inventory (NWI) maps as a forested broad leaved deciduous seasonal type wetland (PFOIC). The reason the entire forest does not appear on the NWI map is probably because these maps were based on aerial photo interpretation which frequently underestimates the size of forested wetlands. According to Vermont Wetland Rules, all wetlands on NWI maps are designated as Class II wetlands, along with unmapped but contiguous wetlands.[21] This status provides the entire floodplain forest with specific protection that is outlined on page 18.

Although most of this forest was likely to have been completely cleared by the early 1800s, it is nevertheless a good example of the floodplain forests that once covered most of the floodplains of the larger river in Vermont before widespread clearing of these areas for farmland. Because of their rich and rock-free soils, these forests were some of the first to be cleared by early settlers, and most continue to be used for agriculture today. This forest is characterized by a canopy of large, fast-growing silver maple (*Acer saccharinum*) trees with a lush herbaceous layer of ostrich ferns (*Matteucia struthiopteris*). There are also areas with dense wood nettle (*Laportea canadensis*), sensitive fern (*Onoclea sensibilis*), and/or white grass (*Leersia virginica*). Other tree species include cottonwood (*Populus deltoides*), boxelder (*Acer negundo*), and American elm (*Ulmus americana*).

Many of the characteristics of this natural community type are related to the typical annual flooding pattern of the adjacent river. In years when the spring thaw causes the rivers to flood their banks, this forest is inundated with floodwaters and nutrient-rich sediments are deposited on the forest floor. Not many tree species can withstand such flooding and sediment deposition. However, plants that are adapted to such conditions benefit from the nutrient-rich soils and grow quickly. Likewise, a few species of herbaceous plants are adapted to withstand this annual flooding. Those that can survive are able to achieve vigorous growth, making the forest floor of this community a dense, lush mat of green in the summer.

Figure 3 delineates the older, more mature floodplain forest from the early succesional forest. This younger forest contains a higher number of boxelder trees and is only about

55 years old (based on a core of a 14 inch diameter boxelder tree). The older forest is dominated by silver maple and cottonwood that are closer to 100 years old. The boxelders in the younger forest are expected to be replaced eventually by the cottonwoods and silver maples and elms since they generally begin to decline after 60 years.

Aside from clearing for agricultural use, the greatest threat to this natural community is the displacement of native plant species by invasive plant species that are spreading into the region. Four invasive species are already established on the McKenzie property. The two that pose the greatest threat are Japanese knotweed (*Polygonum cuspidatum*) and goutweed (*Aegopodium podagraria*). If not controlled, these two species have the potential to entirely dominate the understory of this forest, displacing native species, and having potentially negative effects on the long-term health of the ecosystem. Refer to page 15 for a more detailed discussion of this threat.

**Open wetlands** (<1 acre)
Two non-forested wetlands straddle the east and southeast boundaries of the property. These wetlands do not fit clearly into the natural community classification system, and they may be the result of past modifications made to the landscape for agricultural use. However, they are distinct from both the fields and the forest, so they are briefly described here.

Both wetlands are connected to a larger complex of floodplain forest wetland to the east that drain into, and are fed by, a channel that leads to the Winooski River. In the spring, floodwaters fill these wetlands and they gradually dry out over the summer. The southern wetland may contain standing water all year. Both wetlands are heavily dominated by thick growth of reed canary grass (*Phalaris arundinacea*). The southern wetland is a breeding site for American toads (*Bufo americanus*). In the spring, a loud chorus of the toads' high-pitched calls can be heard from the Intervale Bike Path.[22] Large fish from the river can also be seen in this pool after periods of flooding.

**Fields** (about 38 acres)
Agricultural fields occupy the majority (60%) of the property. These fields are not considered 'natural' communities because they are actively cultivated. Without active management they would eventually revert to forested land. The fields were fallow in 2002, and were filled with a mix of native and introduced species of grasses and wildflowers.

## Flora

The McKenzie property contains some very uncommon plant species, most of which occur on the river sand shore. The floodplain forest, as is typical for such forests, has lush vegetation, but not a great diversity of species. The old fields contain a large number of species. However, many of these species are not native to Vermont, having been introduced from Europe, and they only thrive in the open habitat created by abandoned old fields or other similar disturbances.

Six species of rare Vermont plants are found on the McKenzie property. Five of these plants were found in the river beach complex. The sixth species was found immediately

adjacent to the river bank. See Figure 3 for the general locations of these species. See Appendix I for photos of these plants.

Table 1. Rare plants found on the McKenzie Property in 2002.

| Common name | Scientific name | State/Global Rarity Rank* | # observed on the site in 2002 |
|---|---|---|---|
| Creeping lovegrass | *Eragrostis hypnoides* (Lam.) BSP. | S2S3/G5 | Dense mats, 100s of plants |
| Awned cyperus | *Cyperus squarrossus* L. (syn: C. *aristatus)* | S3/G5 | 10s of plants |
| Redtop panicum | *Panicum rigidulum* Nees. | S3/G5 | 10s of plants |
| Sandbar willow | *Salix exigua* Nutt. | S3S4/G5 | 100s of plants |
| Ovate spikerush | *Eleocharis ovata* (Roth) Roemer & Schultes | S1/G5 | <10 plants |
| Carpenter's square | *Scrophularia marilandica* L. | S3/G5 | <5 plants |

*see Appendix V for a description of rarity ranks.

### Creeping lovegrass

This annual grass species forms dense mats of vegetation along the sandy beach on the north edge of the property. A few scattered individuals also occur along the small areas of beach on the rest of the shoreline of the property.

### Awned cyperus

This species is a small sedge that grows in the sand along with the creeping lovegrass. The plants grow individually or in small clusters, rarely reaching more than a few inches in height.

### Redtop panicum

This is another grass that grows in small clumps in the sand along the river shore. It is a perennial species, so it is generally on the higher areas of the beach that are not scoured by ice as heavily as the lower portions. This species is at the northern edge of its range here in Vermont.

### Sandbar willow

This colonial shrub is found growing on the upper edges of the sandy shoreline. Dense growth of this willow and black willow (*Salix nigra*) form a band that separates the floodplain forest from the more open sand beach.

### Ovate spikerush

This is a small plant that grows in small clumps in the lowest, wettest areas of the shoreline that are generally muddy, rather than sandy. It is an annual plant that is quite uncommon in Vermont.

### Carpenter's square

These wildflowers have very tiny clusters of flowers, so they are not easily noticed. Only a few of these plants were found on the property in 2002 and they were located in an open area at the very edge of the forest, on the top of a very steep section of riverbank. This is a perennial wildflower that grows to be about two feet tall in Vermont.

## Fauna

As a large natural area located far from any major roads or residential or commercial development, the property provides a refuge for various species of wildlife. Along with its secluded setting, the property also contains a diversity of habitats (river shore, forest, open field) that may support abundant wildlife.

### Reptiles and amphibians

The American toad (*Bufo americanus*) is known to be abundant on the property. The wetland that borders the south edge of the property was a prime breeding location for American toads in 2002. Adult northern leopard frogs (*Rana pipiens*) were also seen on the property in 2002, mostly within several feet of the river shore.[23]

The beach is likely to provide turtle nesting habitat because it has extensive, deep, loose sands, abundant sunlight, and a very gradual drop to the water's edge. From a turtle's perspective, these are ideal conditions: it is easy to dig in the sand, it is easy to reach the sand from the river, and there is plenty of sun to keep the sand nest warm. Potential turtle species that may use this habitat are the common painted and snapping turtles (*Chrysemys picta, Chelydra serpentina*) and the rare map, musk, and spiny softshell turtles (*Graptemys geographica, Sternotherus odoratus, Apalone spinifera*).

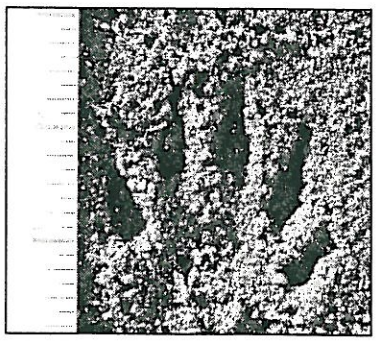
The annual flooding of the forest prevents it from being suitable salamander habitat. Most salamanders need an area of the forest floor that remains dry all year. Some species, such as Blue-spotted salamanders (*Ambystoma laterale*), may be able to use temporary pools that result from spring floods for breeding. However, upland forests are separated from the site by large expanses of agricultural fields, so it is unlikely that they will be found on the property.

### Birds

The forest provides suitable habitat for many nesting songbirds, including rare species such as the Blue-gray gnatcatcher, Tennessee warbler, and Cerulean warbler.[24] The open fields attract predators, like Red-tailed hawk and Rough-legged hawk, that hunt for small mammals. Both the forest and the open fields could also provide habitat for many species of ground-nesting birds. The species list in Appendix V contains a list of 46 different species of birds that nest on or near the ground that could be found on the property based on their range and habitat requirements.

### Mammals

The beach area is known to be used by mink (*Mustela vison*) – their tracks are common on the wet shores of the river in late summer. Beavers (*Castor canadensis*) regularly emerge from the river to harvest branches from the dense growth of shrubs along the upper edge of the beach. Deer (*Odocoileus virginianus*) tracks are abundant on the property year-round. Red fox (*Vulpes vulpes*) also hunt in the forest and fields of the property. Other mammals documented from the Intervale that could make use of the McKenzie property include moose (*Alces alces*), black bear (*Ursus americanus*), river otter (*Lutra canadensis*), fisher (*Martes pennanti*), and coyote (*Canis latrans*). The following small mammals were documented from a similar floodplain property further



Mink track on the river shore.
Photo: B. Carlson

downstream in 1987[25]: short-tailed shrew (*Blarina brevicauda*), white-footed mouse (*Peromyscus leucopus*), and meadow vole (*Microtus pennsylvanicus*).

### Insects

The open sandy beach provides habitat for an enormous number of insects, especially members of the ground beetle family (see Appendix V). On sunny, warm fall days the beach is literally swarming with these insects. In two days in September 2002, 21 different insect species were identified on the sand beach! Although the rare sand dune tiger beetle (*Cicindela hirticollis*) was not found on the site, the habitat is suitable for this species and entomologists should periodically check this beach for this species. Quick searches in September of 2002 also revealed that the floor of the floodplain forest provides habitat for other species of ground beetles not found on the beach.

## Recreational Resources

The property provides a variety of recreational opportunities. Such recreational resources are an important aspect of open space in urban areas, and in an Urban Wild they should be maintained as long as they are compatible with the unique natural resources.

More than a mile of trails passes through the property (Figure 2*)*. The Intervale Bike Path crosses the property and connects the Ethan Allen Homestead with the Intervale Road. This is a popular route for bikers, runners, walkers, and skiers that is used throughout the year, except during periods when the river floods and inundates parts of the trail. This section of the trail is approximately 0.4 miles long.

There is a 0.75 mile trail that runs roughly along the river shore through the property. This trail branches off from the bike path and connects to it again just west of the City's property boundary. A loop beginning on the bike path, following this side trail, and returning to the starting point on the bike path is about 1.1 miles. This trail is narrower than the bike path, and becomes overgrown with nettles by mid-summer. The trail does not pose a threat to the vegetation of the floodplain forest through which it passes. In fact it may be a good interpretive trail to teach visitors about floodplain forests. However, this trail passes very close to the sand beach community, so care should be taken to discourage trail users from leaving the trail to visit this beach. Based on personal observations, this trail only experiences a fraction of the use of the bike path, presumably because of the abundant nettles and mosquitoes in the forest. Portions of both trails are submerged in spring when the Winooski River rises over its banks.

During September of 2002, the sand beach was used on a regular basis by a small number of people who walk their dogs or fish from the beach. The level of use observed in the late summer of 2002 does not appear to be a threat to the health of the ecosystem as yet. The beach does provide a scenic view of the river, but due to the exceptional undisturbed nature of this beach and its statewide significance, it would be appropriate to discourage the use of this beach for recreation.

## CONSERVATION PLANNING

The process of conservation planning involves an analysis of the ecological characteristics of a property along with the human uses of that property and the interactions between the ecological and human aspects. The goal of this process is to identify the conservation targets and threats to those targets. These stresses and threats are then addressed through specific management actions and policies for the property. Of course management actions may also address issues of general property management that are not directly related to the conservation planning issues. The section begins with a Conservation Vision that presents the desired future of the property. This vision is based on the ecological and recreational resources of the property and the stated purposes of Urban Wild areas.

### Conservation Vision

In 50 to 100 years, barring a major natural disturbance, the floodplain forest will be composed of very large trees, with more scattered dead and decaying trees and many young trees naturally regenerating. This combination of age classes will provide a more diverse range of habitats for wildlife than exists in the forest today. The understory will be composed of a suite of native plant species, with any invasive species being confined to small areas. The sandy shoreline may change in shape and size due to the natural movement of the river channel, but it will continue to support teeming insect life and lush vegetation, including healthy populations of the rare plant species that exist today. The open fields may continue to be used for organic agriculture, and the field edges will be lined by bands of mature forest, including a buffer strip along the river shore.

As the population of the Burlington area continues to grow, the Intervale Bike Path will continue to experience an increase in use. With active management, the numbers of visitors to the forest and sandy river shore will be limited to prevent overuse. The property will be recognized and respected by visitors as exceptional natural habitat that is worthy of conservation.

### Conservation Targets

While it is necessary to prioritize natural features that are most unique and sensitive in a given area, these priorities should not imply that the rest of the natural features on the property are not important and worthy of protection. After all, the entire ecosystem is required in order to support the suite of species found in it. With limited resources, however, it is necessary to designate specific areas that are more sensitive than others so that management decisions can focus on protecting those areas.

On this property two areas should be priority conservation zones because of their contribution to the biodiversity of the state. These two zones are: (1) the river shore sand beach with its suite of rare plants, and (2) the floodplain forest.

## Stresses and Threats to Conservation Targets

### Excessive use

Too many people visiting the sand beach presents a significant threat to the conservation of the beach ecosystem and the plant and animal species it supports. At first this statement seems counterintuitive because the beach and the wildlife that live there are adapted to extreme conditions – very dry soil (sand) in summer, flooding in spring, and ice scour in the winter. Despite the ability of the plants and animals to survive in these conditions, they are sensitive to the disturbance caused by foot traffic. For example, the larvae of the many beetle species that inhabit the beach can be crushed by people or dogs walking on the beach, or their burrows can be collapsed, or they simply will hide while people are present, decreasing the time they have available to hunt for food. Although the area is not a documented turtle nesting area, the presence of visitors on the beach will discourage turtles from nesting in the ideal sandy habitat. Some of the rare beach plants are tiny annual species. They are shallowly rooted and some are barely noticeable. Foot and bike traffic can dislodge these plants from their tenuous hold on the shifting sands, eliminating their ability to reproduce and set seeds for the following summer.

The floodplain forest and its plants and wildlife can probably sustain large numbers of visitors only if visitors and their pets stay on existing trails. Ground-nesting birds and other wildlife, especially during periods of raising young, are easily disturbed by people or pets wandering off the trails. Dogs wandering off the trail will significantly increase the width of the impact of this trail, especially given the relatively small size of this forest. So it is important to keep dogs leashed. If visitors and pets remain on existing trails, the wildlife that rely upon the forest habitat are more likely to grow accustomed to this use. Unfortunately, leash rules in natural areas have low levels of compliance, so the best way to avoid disturbance to the forest and beach area is to discourage use of the footpath by dog walkers.

### Natural disturbance

The river shore is constantly being re-shaped by the current of the river. This dynamic process of shore building and erosion modifies the habitat available to the species that rely upon the river shore. As discussed above, most of the species are adapted to the seasonal floods and ice scour. The willows growing on the margin between the forest and the open sand beach need some open sun, but cannot tolerate severe ice scour. Other beach plants that occur in the open sand, closer to the river shore, depend upon the severe scour to keep woody shrubs from covering the open beach. It is possible that high water late in the summer would damage the annual beach plants that are flowering and seeding at that time. However, as discussed in the Hydrology section, this would be a natural event that is not likely to be prevented or exacerbated by the dams upstream.

The annual flooding also causes disturbance to the floodplain forest. Each flood deposits another layer of silt, raising the ground level relative to the tree roots. Logs and ice floating in the floodwaters also damage the trunks of standing trees as they are washed through the forest. Just like the beach species, the trees and herbaceous plants of the forest are adapted to this disturbance, and it is this disturbance that makes the forest different from more common upland forests.

### Invasive species

Throughout natural areas of the entire country, invasive exotic plant and animal species are becoming a growing problem. These are species "which have been purposefully or accidentally introduced outside their original geographic range which are able to proliferate and aggressively alter or displace native biological communities."[26] In general, floodplain forests are especially vulnerable to invasive plants because they have rich soils and the soil is disturbed each spring by flooding, making it easy for new plants to move into the area. The floodplain forest of the McKenzie property is currently faced with this threat.

In 2002 four invasive species of concern were found in the floodplain forest on the property: Japanese knotweed (*Polygonum cuspidatum*), goutweed (*Aegopodium podagraria*), common buckthorn (*Rhamnus cathartica*), and multiflora rose (*Rosa multiflora*). The first three of these species are among the most invasive species that are currently found in Vermont, appearing as a "Category I" species on the list of Invasive Exotic Plants of Vermont.[27] The last species, while still invasive, is slightly less aggressive and is considered a "Category II" species.

To varying degrees, these species have the ability to dominate the understory of a forest and prevent other, native plant species from growing. They are very difficult to remove and control, but right now they are found in relatively small areas on the property, so there is an opportunity to control them. Factsheets in Appendix III contain more detailed information about these species, but some basic facts are presented below.

Japanese knotweed is a large plant that grows very quickly and forms dense thickets that can easily reach heights of over 10 feet. Virtually no other plants can grow beneath the shade of these thickets. The plants grow from underground rhizomes that resprout every year and can spread underground. So even if you cut down an entire thicket, new shoots might grow up many feet from the original location. Fortunately, this plant is found in just three patches along the footpath in the northeast corner of the property, so it may be possible to contain it and even reduce its numbers (see Figure 4). In March 2003, the three patches measured roughly 45ft, 100ft, and 30ft across at their widest points. The 45ft patch is the first patch encountered when walking west to east on the footpath. It is located on the north side of the path. The second patch (100ft across) is on the south side of the path. The third patch is closest to the river and grows between two branches of the footpath.

Goutweed is another thicket-forming plant, though it is only a couple of feet high, forming a dense ground cover. It was, and still is, widely used in flower gardens and even gardeners find that it often overtakes the other plants in their gardens, and they have a very difficult time controlling it. This species is more scattered throughout the property than the Japanese knotweed. Control methods for this species are still being developed.

Common buckthorn is a shrub that can displace most other understory shrubs and herbs in forests where it becomes established. It produces berries which are eaten by birds, and when the birds defecate the seeds are spread rapidly throughout a forest and between forested areas. These plants are mostly found along the forest edges, but some have penetrated deeper into the forest, probably due to seeds being dispersed by birds. Multiflora rose produces beautiful, showy flowers, but it can crowd out native plant species in forested areas. In 2002, several of these plants were found growing in the forested area within sight of the fields.

## MANAGEMENT

The management policies and actions that are described below are designed to abate the stresses and threats listed above and to achieve the conservation vision. This section begins with a general discussion of the management, followed by proposed policies and specific actions.

### General Management Discussion

The beach should be managed for minimal use during the growing season (beginning of May through the end of October). It is not possible to define the level of use above which irreversible damage is done to this ecosystem, but current levels of use appears to be sustainable judging by the existing abundance of plant and wildlife on the beach. It should certainly never be promoted as a public river access or beach area. Use levels need to be monitored over the years to ensure that use levels remain low since the use of the Intervale Bike Path is expected to continue to increase as the population of the region continues to increase.

The forest should be managed to remove invasive species and maintain the native suite of species. No new trails should be allowed through the forest. Minimal maintenance on the existing trails is required – the soils are very solid and do not easily erode. The trail should be monitored monthly during the summer and fall for trees that may have fallen across the trail. It should also be monitored for the development of unauthorized trails that lead to the beach area. Bikes should not be allowed on the forest path. The trail has too many blind turns to safely accommodate bikers and hikers together. The path could be made more pleasant by using hand tools to knock down nettles growing into the path, but the path itself should not be widened. Trash in the forest should be removed. Small trail marker signs could be installed to ensure that visitors can follow the trail and not make multiple paths through the forest. If there is a strong desire to establish a path that is more suitable for higher use levels by bikes and pedestrians together, another option is to relocate the existing trail so that it is straighter and farther from the beach.

The fields on the property are indefinitely leased by the Intervale Foundation for organic agricultural use. This use does not appear to conflict with the management of the remainder of the property as an Urban Wild; however, the Urban Wild designation does not include this type of use. If the Intervale Foundation gives up its lease on the property, the City should change the management of the fields to increase the contribution of the property to the biodiversity of the region. This management would include allowing the field north of the bike path to convert back to floodplain forest. The field south of the bike path could be maintained as an open field in order to provide habitat for grassland nesting birds like bobolink and eastern meadowlark, both of which have been seen in the Intervale. This would require annual mowing of the field to prevent trees from growing, and this activity should occur in late summer to allow time for the birds to nest.

**Pertinent Natural Resource Laws**

The entire floodplain forest is classified as a Class II wetland, as defined by the Vermont Wetland Rules. As a significant wetland, this forest is protected by these rules from any draining, dredging, filling, grading, or alteration of the water flow. At the Federal level, Section 404 of the Clean Water Act also regulates the dredging or filling of wetlands.


## Figure 4. Management Recommendations

Legend

Management zones
- low use sandy rivershore
- tree planting area

Trails
- bike path
- side trail

Mckenzie property

100 0 100 200 Feet

Digital Orthophoto scale: 1:1250, date: 2000
Trail locations are estimated to be accurate within 50 feet.
Map produced March 2003

Winooski Valley Park District

## Proposed Policies

- Allowed uses include passive recreation such as hiking, walking, running, skiing, snowshoeing, and nature observation on the existing trails. Biking is allowed on the bikepath, but bikes are prohibited from the beach area and from the forest path.

- The sandy area of the river shore (Figure 4) is not suitable for frequent use of any kind from May through October due to the large concentration of rare, easily disturbed, plants.

- Dogs are allowed on the property, but they should be kept on the trails and on a leash. Dog waste should be removed. Dog-walking on the forest path and beach should be discouraged since the negative impacts of dogs could be significant in these areas. Dogs running freely through the woods can disturb the wildlife and plants, especially ground-nesting birds (see Appendix V for a list of potential species) and shallowly-rooted beach plants. Since this property is a natural area, protection of wildlife and plant life must be given a high priority. Dogs off leash can also lead to conflicts with other users. As a public area, it is important that all users can feel comfortable using the property. This leash policy is a compromise that should minimize negative impacts on wildlife and still allow dog-walking on the property.

- No motorized vehicles allowed (with the exception of vehicles being used for farming activities in the agricultural fields).

- No creation of new trails – Users must stay on existing trails.

- No collecting of plants without permission from Parks and Recreation. Permission should be granted only for educational or research purposes (i.e. not for commercial collecting). Collectors should not collect underground parts of the plants or any rare plant species. Provide collectors with a list of the known rare species on the property.

- No dumping of trash or lawn waste on the property.

- No cutting of trees (except hazard trees). Refraining from active forest management may eventually result in different tree species dominating the forest and may lead to more diseased or dead trees than might be found in a forest managed for timber production. However, as an Urban Wild, the purpose of this property is to serve as a natural area where natural processes are allowed to proceed without interference. For this reason, tree cutting is not a recommended use for this property. Exceptions include removal of trees that present imminent threats to trail users (i.e. a blow down that is dangling over the trail or a dead tree adjacent to the trail that is about to topple over), and removal of invasive shrub species.

- No camping or campfires. Camping and campfires on the sand beach are not compatible with the sensitive habitat for plants and wildlife in the riverbeach complex. Frequent camping anywhere on the property also creates a sanitation

problem. The entire area is in the floodplain of the river and there is no suitable place to dispose of human waste. Of course campfires also pose the danger of spreading, especially during dry periods. Long-term camping may also discourage potential users from visiting the property. An established camp gives the impression that the camp owner has some claim to that area and this makes some visitors uncomfortable about being in the same area.

### Specific Management Tasks

The recommended tasks are presented briefly in the following table and discussed in greater detail in the text below. Those tasks marked with an asterisk are considered highest priority and should be addressed as soon as possible.

Table 2. Recommended management tasks for the McKenzie property. The asterisks (*_*) indicate high priority tasks. More details are provided in the following text.

| TASK | DESCRIPTION | TIMELINE | PARTICIPANTS |
|---|---|---|---|
| **Invasive species control** | | | |
| *Japanese knotweed* | Cut down plants | 3x/summer | Volunteers |
| Goutweed | Contact The Nature Conservancy | Fall 2003 | Parks & Rec |
| Buckthorn | Cut down plants or girdle plants | 2x/summer or winter | Volunteers |
| Multiflora rose | Cut down plants | 3-6x/year | Volunteers |
| | | | |
| **Trails** | | | |
| *Monitor forest path and beach use* | Monitor level and type of use of forest path and beach | May - October | Volunteers |
| *Re-install post to deter vehicle access* | Replace the fallen post on the bike path on the west property line | As soon as possible | Parks & Rec |
| Re-route forest path | Move west end of forest path to stay entirely on city property. | Anytime | Parks & Rec |
| Maintenance of forest path and bike path | Watch for new trails, fallen trees, flood damage | Monthly during spring/summer/fall | Volunteers/Parks & Rec |
| Monitor and control impacts of dog use | Monitor compliance of dog owners with leash rules; use signs to encourage compliance. | Anytime | Volunteers/Parks & Rec |
| | | | |
| **Increase public awareness & appreciation** | | | |
| *Signs* | Install trail & boundary signs | Anytime | Parks & Rec and Intervale Foundation |
| Brochure | Prepare a brochure with map, property description & policies | Anytime | Parks & Rec / Volunteers |
| Promote volunteer opportunities | Recruit trail monitors, turtle monitors, trash clean-up crews, invasive species removal crews, and wildlife trackers | Year-round | Parks & Rec |
| | | | |
| **Biological information gathering** | | | |
| Organize biological information | Develop a central location for all information about rare and invasive species on the property | Anytime | Parks & Rec |

| | | | |
|---|---|---|---|
| Search for *Cyperus odoratus* | Search on the sandy shoreline for the rare sedge species *Cyperus odoratus* | Summer | Volunteer botanist or VT Nongame & Natural Heritage Program Staff |
| Turtle monitoring | Visit beach periodically to watch for nesting turtles | As soon as water levels drop in spring – mid July | Volunteers |
| Add to the species list for the property | Encourage naturalists to submit their findings on the property | Anytime | Volunteers |
| | | | |
| **Other management issues** | | | |
| *Shoreline reforestation* | Plant native trees along river shore | Summer | Collaborate with Intervale Foundation |
| Hedgerow expansion | Allow hedgerows to become forested | -- | Collaborate with Intervale Foundation |
| *Trash cleanup* | Remove appliances/vehicles/scrap metal | Spring/Summer/Fall | Volunteers |
| Survey boundaries | Survey and mark boundaries | Anytime | Professional Surveyor |

**Invasive species control**

Control of invasive species requires persistence and a sustained effort over several years. Detailed records should be kept to document the extent of the invasive species and the control methods used. This record-keeping allows for adjusting management prescriptions depending upon the effectiveness of the control methods.
Since invasive species control is a time-consuming process, it is necessary to prioritize which species pose the greatest threat to the conservation targets of the area. Japanese knotweed and Goutweed are the two priority invasive species for control based on the threat posed to the forest ecosystem. The other two species should be addressed, but they should be given a secondary priority.

With practice, identification of the invasive species on this property is fairly straightforward and the fact sheets in Appendix III will help with identification. However, large groups of untrained volunteers should not work unsupervised and risk damaging the native shrub species. Have one or two people who are confident with their identification skills flag or paint the invasive shrubs so that the rest of the group can just remove the marked shrubs.

- Knotweed control involves chopping down the large stems every year, preferably three times per summer, in order to kill the underground roots (rhizomes). Once the population spreads over large areas, it becomes more time consuming to use this method, so it is very important to act quickly against this plant. It is also important not to chip the plants because a piece of knotweed the size of your little fingernail can grow into a new plant.[28] Herbicide use is not recommended on this property due to its proximity to the river.

- Very little is known about effective control of goutweed. Pulling up the plants is not effective because if any fragments of the roots are left in the ground they can sprout new plants. The Vermont Chapter of the Nature Conservancy is planning a study of goutweed control in a floodplain forest beginning the summer of 2003. Contact

them for the most up-to-date recommendations for control of this species (see Appendix IV for contact information).

- Buckthorn can be controlled by girdling the shrubs near the base with a 2-3cm wide cut through the bark. Another recommendation that may work for smaller plants is to pull up the plant with a 'weed wrench', which will remove the roots as well. However, this approach has had unsatisfactory results.[29] A third approach is to cut the shrubs down twice per year (in early June and late August) for a few years in a row. Currently there are not extremely large numbers of these plants on the property, so with a combination of these efforts it may be feasible to remove enough of these plants to wipe them out of the property.

- Multiflora rose can be controlled by cutting 3-6 times per year for 2 to 4 years in a row.[30]

**Trails**

- Monitor forest path & beach use:
  Do not promote use of the forest path – leave it as it is with low use. Promoting use of this path would require extra effort to ensure that the beach does not get too many visitors. Even without promoting the path, use is likely to increase as use of the Intervale Bike Path increases. For this reason it is important to monitor use of the path and the number of those users who go onto the beach. This monitoring could be done by volunteers who walk the path on a regular basis during the summer months. It may also be done by having a volunteer spend a few hours at the site during the highest use periods of the week – probably weekend days.

  To discourage path users from spending time on the beach, the first step should be to install one or two signs on the beach that inform visitors of the fragile nature of the beach and the importance of staying off the beach during the summer months (May through October). If, despite the use of signs, use continues to increase, the next step would be to relocating the trail further from the shoreline. Any trail relocation should be done without cutting trees. This option would also require significant effort to brush-in the existing trail to prevent its continued use.

- Reinstall post to deter motor vehicles:
  The post located along the western McKenzie property boundary that deters vehicles from using the Intervale Bike Path was knocked down in 2002. This post should be reinstalled as soon as possible to ensure that no vehicles can access the adjacent Fitzgerald property via the bike path.

- Re-route forest path:
  The west end of the side trail through the forest currently passes across privately-owned land. Re-routing this section of the trail as shown in Figure 4 would keep the entire path on city-owned land. The suggested route shown in Figure 4 is approximate. The actual route should be determined on the ground to avoid cutting down any trees.

- Maintenance/improvement:
  The main bike path can be damaged during high water (as it was in spring of 2002), so it should be assessed each spring as soon as flood waters have receded, and repaired as needed. The forested trail should be monitored monthly for dangerous trees or trees blocking the trail so that no users are hurt and no new trails are formed. It should also be monitored for the creation of unauthorized trails and those should be brushed in as soon as possible and a sign could be put up asking people to discontinue use of the trail and stay on existing trails. Being in a wetland, this trail does have some muddy areas. However, improvements aside from using hand tools to create better drainage around those areas are extremely labor intensive. The other options would require adding surpac gravel and constructing wooden cribbing to hold it in place. In a severe flood, this labor intensive improvement could be quickly washed away.

- Monitor and control impacts of dog use:
  Monitor the use of the trails by dog walkers and note their compliance with keeping dogs on leash and cleaning up their waste. If dog walkers are not keeping dogs on a leash and are not cleaning up after their dogs, action should be taken to encourage compliance. One method is to use signs to educate users about the importance of these rules and to warn that failure to follow these guidelines could lead to the loss of the opportunity to walk dogs on the property. If demand for dog-walking is high, consider creating a loop trail around the perimeter of the agricultural fields. Dog-walking around the perimeter of the field should have fewer negative impacts than dog-walking on the forest path.

**Increase public awareness & appreciation of the property**

- Signs:
  Coordinate sign location and design with the Intervale foundation. They are planning to increase their activities in the area, and are likely to have signs of their own. Consider installing signs along the boundaries that indicate that the property is an Urban Wild owned by the City (see Appendix VII for samples). Consider installing one sign at each end of the forest path that asks users to please stay on the trail, and explains other policies (i.e. walk dogs only on bike path).

- Brochure/interpretive guide:
  Consider creating an interpretive guide that educates visitors to the property about the importance of the property – the unique floodplain forest, wildlife habitat, rich agricultural soils, and rare river shore plants.

- Volunteer opportunities: Providing residents with productive opportunities to help steward the property is an excellent way to increase local support of Burlington's Urban Wilds. Volunteer opportunities can include individuals working on their own or large groups gathered for a whole day of work. Suggested volunteer roles:
  - Trail monitors. One or two people who walk the trails on a regular basis who could report any hazardous trail conditions (i.e. dangerous trees overhead or large limbs in the trail) and development of new, unauthorized trails.
  - Trash clean-up crews.
  - Invasive species removal crews.

- Winter wildlife tracking.
- Turtle monitors. Trained volunteer(s) who could monitor the river shore for use by nesting turtles.

**Biological information gathering**

- Develop a system for maintaining information about both the uncommon plants and animals that are documented from the property, as well as the abundance of invasive species. This could be as simple as maintaining a file folder for all reports of birds, plants, turtles, or other wildlife. This could prove to be a valuable resource in the future if new management issues surface, and could help evaluate effectiveness of management activities.

- Turtle nest monitoring:
  The sand beach appears to be excellent habitat for nesting turtles; however, they have not been documented yet. In order to find out if turtles use this beach, a turtle monitoring program could be started. Such a program would be a good way to involve members of the public with the stewardship of this park. Simply by having individuals visiting the beach on a regular basis, there would be a 'presence' on the beach that might discourage inappropriate uses of the beach. The Winooski Valley Park District has a model that could be followed for turtle monitoring. The program would involve volunteers spending a few minutes checking the beach once a day from mid-June until late July or mid-August to look for evidence of nesting turtles. They should do the searching with binoculars from the edges of the beach or from a boat in order to avoid impacting the plants and insects of the beach. If abundant and/or rare turtles are found, it will be important to put up signs emphasizing the importance of staying off the beach during the turtle nesting periods.

- Search for *Cyperus odoratus* on the sand beach. This plant has not been documented in Vermont for many years, and it is possible that it occurs at this site.

- Encourage naturalists to submit lists of all species that they find on the property.

**General property management**

- River shore reforestation:
  In a 1995 report to the Intervale Foundation, one of the high priority areas for reforesting the shoreline is on the McKenzie property (See Figure 4).[31] Creating a forested buffer between the agricultural fields and the river should help to stabilize the river shore and will add valuable wildlife habitat. The State of Vermont Agency of Natural Resources recommends that the width of such a buffer strip should be at least 50–100 feet.[32] However, a buffer should be 200 feet wide[33] to provide suitable habitat for reptiles, amphibians, and river shore mammals. It is a goal of The Intervale Foundation to plant trees in this area, so they are an obvious partner, and perhaps may take the lead on this project. The Intervale Conservation Nursery already has thousands of native tree seedlings and is partnered with The Nature Conservancy and Vermont Department of Fish and Wildlife.

- Hedgerow expansion:
  Forested strips between agricultural fields provide useful habitat and movement corridors for various species of wildlife. The property is mostly ringed by such hedgerows, but Figure 4 shows one area where the forested corridor could be expanded so that it creates a more intact strip of forest. This task could be accomplished by planting trees or simply refraining from cutting or tilling along this property line.

- Survey property boundaries:
  This is a low priority because there are no current boundary issues and the property lines appear to be very easy to locate. However, surveying and signing property boundaries as an Urban Wild may help to increase public awareness of the property.

- Trash cleanup:
  Two junk cars and a few appliances and tires could be taken out of the forest. Most of these items are located within sight of the forested footpath. The smaller items could be tackled easily by a small group of volunteers. Some groups that may have volunteers available include: IBM volunteer group, UVM community service group, First Unitarian Universalist Society, Boys and Girls Club, and VISTA-Americorps. The Chittenden Solid Waste District's Community Cleanup Fund can be used to help pay for the cost of disposing the trash. Removal of the cars would be a much larger project. Probably most of the cars' fluids have long since leaked out, so they are not a current hazard to the environment. However, they are adjacent to the footpath and certainly detract from the natural beauty of the forest. The cars would require some heavy equipment to remove, and the equipment would have to be small enough to maneuver on the narrow trail. In order to remove the vehicles it might be best to haul them out when the ground is frozen and when there is not deep snow. However, in this case it might be necessary to get the vehicles up and out of the soft mud and onto pallets or boards before the ground freezes.

## REFERENCES


[1] City of Burlington. 04 February 2002. Resolution Relating to: Conservation Legacy Program.

[2] City of Burlington. 2002.

[3] Meals, Don, and Wayne Gross. 30 January 2002. Burlington Conservation Board Memorandum: City Council Resolution – Conservation Legacy Program.

[4] Chittenden County Community Planning Tool website, Accessed 12/20/02, http://crs.uvm.edu/rpcs/chittenden/

[5] Reno, Rebecca. 1993. The Burlington Intervale. An Intervale Community Farm publication.

[6] Mertz, Cadence. 2002. Homeless camp raises questions. Burlington Free Press, May 3, 2002.

[7] Reno, Rebecca. 1993.

[8] Pinello, M. and P. Thomas. 1979. Exploratory Archaeological Excavations at the Ethan Allen Farmhouse. Department of Anthology, University of Vermont, Report #20.

[9] Reno, Rebecca. 1993.

[10] Severson, Jeff. Patterns and Causes of 19th and 20th Century Shoreline Changes on the Winooski Delta. Field Naturalist Program, University of Vermont.

[11] Thomas, P.A. 1985. Archaeological and geomorphological evaluation: Burlington M5000 (3) Northern Connector Material Supply/Disposal Area. Howe Farm Floodplain. University of Vermont, Department of Anthropology, Report #54, 41pp.

[12] Doll, C. 1961. Centennial geologic map of Vermont. Vermont Geological Survey. Montpelier, VT.

[13] Reno, Rebecca. 1993.

[14] Allen, G.W. 1989. Soil Survey of Chittenden County, Vermont. USDA Soil Conservation Service.

[15] USGS Water Resources Website. Monthly Streamflow Statistics for Vermont: Winooski River Near Essex Junction, VT. http://waterdata.usgs.gov/vt/nwis/monthly/?site_no=04290500&agency_cd=USGS. Accessed February 12, 2003.

[16] Thompson, Colin. Winooski One Hydro. Personal Communication.

[17] NOAA-CIRES Climate Diagnostics Center website, http://www.cdc.noaa.gov, accessed 8 November 2002.

[18] Reno, Rebecca. 1993.

[19] Thompson, E. and E. Sorenson. 2000. Wetland, Woodland, Wildland: A guide to the natural communities of Vermont. University Press of New England, Hanover, NH.

[20] Thompson, Elizabeth. 2002. Personal Communication.
[21] Water Resources Board. 2001. Vermont Wetland Rules, Adopted December 10, 2001, Effective January 1, 2002.

[22] Carlson, Brian. 2002. Personal Observation.

[23] Carlson, Brian. 2002. Personal Observation.

[24] Brodie, Charlotte. 1999. Vermont Wetland Evaluation Form: Burlington Intervale Bike Trail, Project #: B16233P.

[25] Bazilchuk, Nancy R. 1987. Vegetation, geomorphology, and small mammal populations in Half Moon Cove, Colchester, Vermont. Field Naturalist Program, Department of Botany, University of Vermont.

[26] Vermont Invasive Exotic Plant Fact Sheet Series. Spring 1998. Produced by the VT Departments of Environmental Conservation and Fish and Wildlife, and The Nature Conservancy of Vermont.

[27] Vermont Invasive Exotic Plant Fact Sheet Series. 1998.

[28] Japanese knotweed control forum for Cornwall website. http://www.ex.ac.uk/knotweed/ . Accessed 23 December 2002.

[29] Clark, F. H. 1998. Lifestyles of Invasion: Common & Glossy Buckthorn. New England Wild Flower, Vol 2, No. 3.

[30] Clark, F.H., C. Mattrick, and S. Shonbrun. 1998. Rogues Gallery: New England's Notable Invasives. New England Wild Flower, Vol. 2, No. 3.

[31] Stevens, M., J. Rubin, D. Livellara, J. Rochette. 1995. The Burlington Intervale: Connecting Natural Areas and Agriculture. A Report prepared for The Intervale Foundation.

[32] Agency of Natural Resources, State of Vermont. 27 July 2001. Riparian Buffer Procedure.

[33] Parren, Steve. No Date. Habitat Features and Suggestions for their Protection. Unpublished report of the Vermont Nongame and Natural Heritage Program.

# McKenzie Property
# Inventory, Assessment & Management Plan

## Appendices

I. Photos of the property
II. Interpretive/informational guide to the property
III. Invasive species fact sheets
IV. Contact information
V. Species lists
VI. Copy of deed
VII. Sample of natural areas boundary sign
VIII. CD with Text, Photos, and GIS data layers

## APPENDIX I. COLOR PHOTOS

**Rare plants species:**

**Redtop panicum** (*Panicum rigidulum*)

NOBLE FOUNDATION PLANT IMAGE GALLERY – http://www.noble.org/imagegallery/grasshtml/RedtopPanicum.html

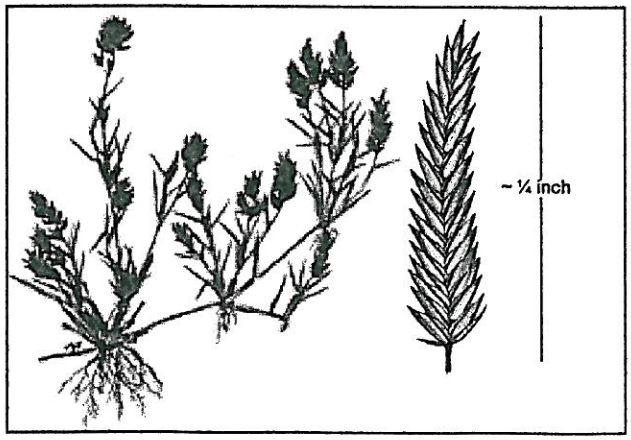
**Carpenter's square** (*Scrophularia marilandica*)

http://www.usi.edu/science/biology/TwinSwamps/Scrophularia_marilandica.htm

**Awned cyperus** (*Cyperus aristatus*)

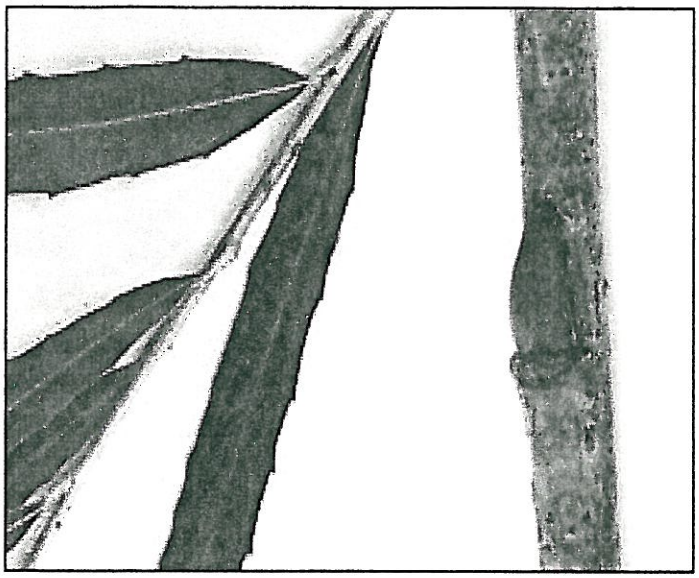
http://www.botany.wisc.edu/herbarium/wisflora/scripts/detail.asp?SpCode=CYPSQU
Photographer: Emmet J. Judziewicz

**Creeping lovegrass** (*Eragrostis hypnoides*)



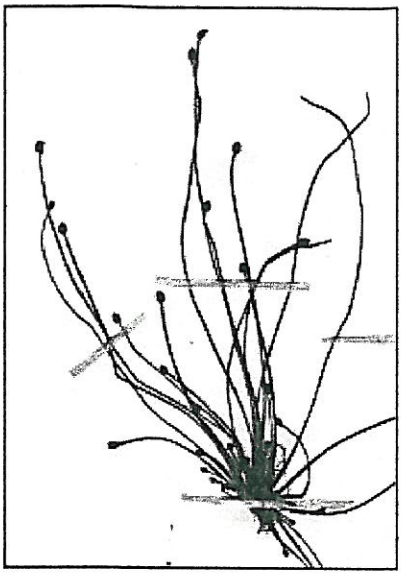

http://www.csdl.tamu.edu/FLORA/image/k4544500.htm

**Sand bar willow** (*Salix exigua*)



http://www.iastate.edu/~bot356/species/species/p_tspecies/SaliInte.html

**Ovate spikerush** (*Eleocharis ovata*)



Source not specified

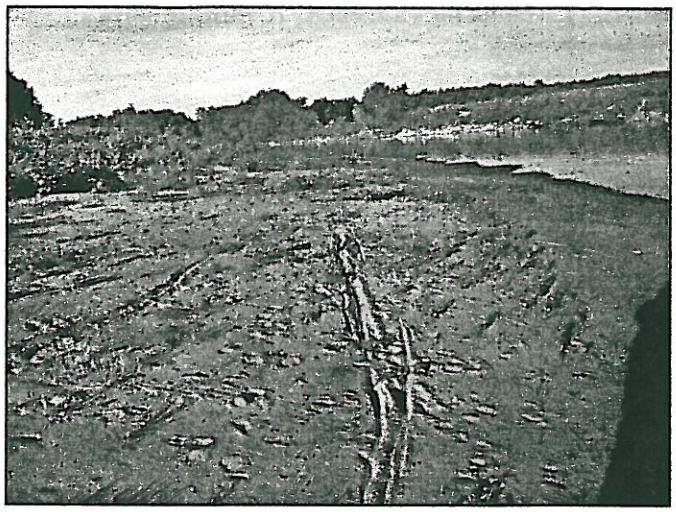
**More McKenzie Property Photos:**

*Photos taken by Brian Carlson between August 2002 and March 2003 at the McKenzie property.*

**Silver maple with damage from flooding**

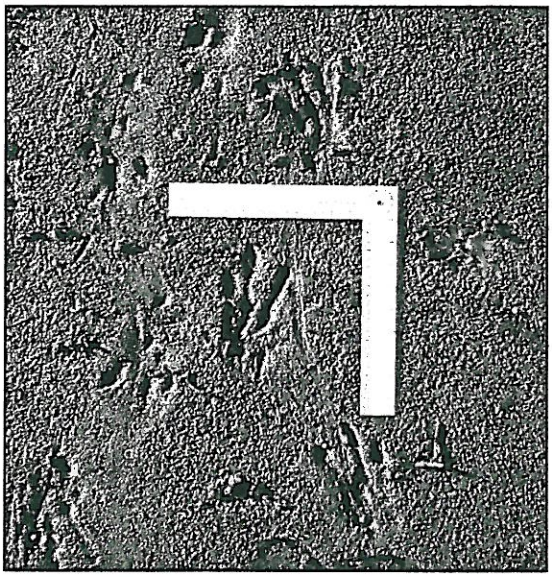
**Property corner marker – on east side of property adjacent to the intersection of the bikepath with the forest path.**

**Sandy rivershore with evidence of use by bikes**



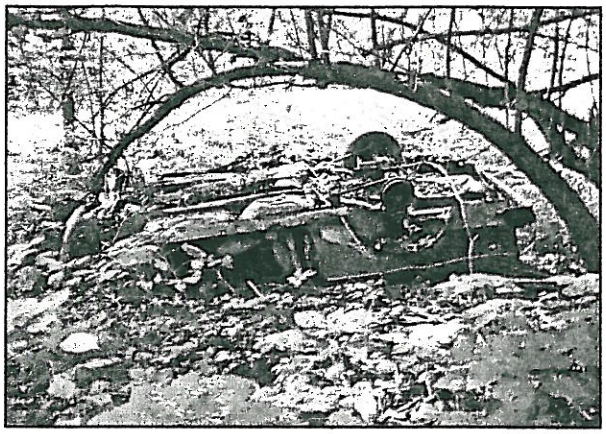
**Campfire on the sandy rivershore**

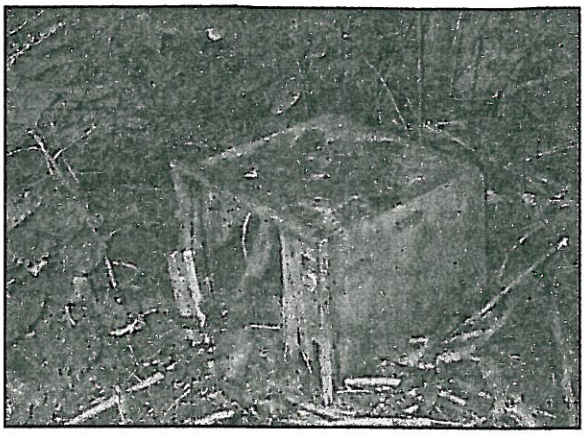
**Beaver tracks on the rivershore**



**Old drainage ditch in the floodplain forest**

**One of the junk cars and junk appliances on the property**





## APPENDIX II. INTERPRETIVE MATERIAL

*This is a brief property description that might be useful when assembling brochures or signs for visitors to the property.*

The McKenzie Property in the Intervale is 63 acres of forest and agricultural fields located in some of the most fertile land in Vermont. If you follow the Intervale Bike Path north from the end of Intervale Road, you will pass through the agricultural fields of the property. Beyond the fields to the north is a floodplain forest.

Before the first European settlers arrived in the Champlain Valley, most of the Intervale was covered with a forest like the one you can see from the bike path. These settlers quickly recognized that all the land in the Intervale was especially fertile. Whenever the Winooski River floods (as it does nearly every spring), it deposits layers of nutrient-rich sediments. After centuries of flooding, the soils in the Intervale have become very fertile. Despite the extensive forest, the settlers quickly cleared the forest for agricultural use. The fields you see today were probably first cleared in the late 1700s. Ever since that time these fields and the others in this valley have been critical to the Burlington population for growing crops and hay.

This pattern of clearing floodplains for agricultural use was repeated throughout Vermont. For this reason, there are very few remaining forests in these floodplains. The forest you see on the McKenzie Property is one of the few forests that are remaining in Vermont floodplains. It too was probably cut in the late 1700s, but in the past 100 years it has become reforested.

There is a narrow trail that leads through this forest. This path will give you a closer look at the unique floodplain forest. You may notice many trees with large scars near their bases. These are scars caused by past flooding. Imagine the river flowing through this forest, carrying pieces of ice and picking up dead logs and branches. The force of this debris being carried by floodwaters easily damages the trees. If you venture into this forest on the footpath in the summer, be sure to watch out for stinging nettles that are abundant along the trail.

Another unique natural feature of the property is its shoreline. Although much of the shoreline is a steep drop from forest down to the river, there is one section of shoreline that is much more gradual. This area, along the northern edge of the property, gradually changes from forest to shrubs to an uncommon type of sandy river shoreline. This area of the shoreline is scoured by ice every winter, keeping it clear of trees. Without trees, it allows a variety of unique plants to grow each year. Most of these plants are small annual grasses and sedges that grow from seed each year. The open, sandy soils also support huge numbers of insects, including many different types of beetles.

The property provides excellent habitat for many types of wildlife. Mammals such as deer, fox, beavers, river otters, mink, and fisher can all be found either crossing the property or using the river shore areas. If you are on the bike path on a warm, sunny, spring day, you may be able to hear the loud trill of American toads calling from the wetland on the south edge of the property. Always keep your eyes on the sky for hawks that are often seen soaring over the fields. There are also many species of songbirds that spend their time in the forest. They are more difficult to spot, but their songs can easily be heard if you walk along the forest path.

## APPENDIX III. INVASIVE SPECIES FACT SHEETS

Control of invasive species in natural habitats is not a simple process. After all, these plants are a nuisance precisely because of their ability to thrive under many circumstances. However, there are many organizations that are actively pursuing new methods of control. One of the most active organizations working in this field is The Nature Conservancy. A local contact at the Vermont Chapter of The Nature Conservancy is Rose Paul, Director of Science and Stewardship (rpaul@tnc.org, 802 229-4425). The Nature Conservancy has developed a template for a "weed management plan". This useful resource is available at: www.tncweeds.ucdavis.edu/products/plans/weedtemp.rtf.

The following fact sheets contain basic information about identification and control of the invasive plant species found on the property.

**Goutweed, Bishopweed or Bishopswort**
*Aegopodium podagraria*

Apiaceae, Parsley Family

**Description:** Goutweed is a stout, erect perennial herb, that is 1 1/2 to 2 feet tall, sometimes more. The stem is round, furrowed and hollow. It has a creeping root-stock and by this means it spreads rapidly and soon establishes itself, smothering all vegetation in its vicinity.

It has large, shining, alternate, twice compound leaves. The umbels of flowers are rather large (resembling Queen Anne's lace), with numerous, small white flowers, which are in bloom from June to August and are followed by flattened seed-vessels which when ripe are detached and blown some distance by the wind

Cultivated goutweed is a variegated form of the plant. Occasionally the plants will revert to the green form, and it is this form that becomes so tenacious.

**Habitat:** Goutweed (the variegated cultivar) is commonly planted as a ground cover in shaded areas. The green form spreads easily in shaded areas near homes where the variegated form was originally planted; its tolerance of shady conditions is unusual for an invasive exotic. It also escapes to natural forest areas where it can spread rapidly and become the dominant plant of the forest floor. It escapes most often (in Vermont) into lowland woods, such as floodplain forests, but it has been seen in upland hardwood forests as well, where soils are somewhat enriched.

**Threats:** Goutweed is an aggressive invader that threatens forested and open areas. Goutweed has been noted in the floodplain forests of Vermont, Connecticut, and Massachusetts. In some forests it has been observed expanding rapidly, covering up to 90% of the ground in some areas. Goutweed may endanger native vegetation in floodplain forests. As these forests are already uncommon, the potential threat to the integrity of a few floodplain forests in the state could lead to a serious loss of Vermont's natural heritage.

# MAINE INVASIVE PLANT FACT SHEET

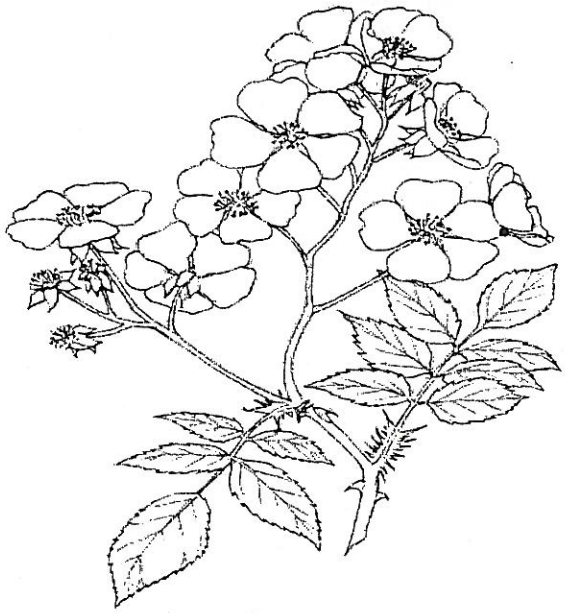
## Multiflora Rose, Rambler Rose

*Rosa multiflora*
(Rose Family)

**Description**:
Multiflora rose is a robust perennial shrub with thorny arching stems. It has alternately arranged compound leaves mostly with 7 or 9 leaflets. It forms large clusters of fragrant white or pink flowers which bloom from June to July. Like other roses, it forms small red pulpy fruits called hips which may be eaten by birds. It reproduces from seeds or by rooting at the tip of arching stems that touch the ground. It can be distinguished from native roses by its long arching stems and numerous small white flowers or hips depending on the season. To verify identification of this plant contact a natural resources professional.

**Habitat:**
Multiflora rose prefers old fields, fence rows, powerlines, roadsides, and forest edges. In other parts of its range it is successful in the understory of hardwood forests. It tolerates both moist and relatively dry conditions.

**Threats to Native Habitats:**
Multiflora rose is an aggressive colonizer of open unplowed land, and is highly successful on forest edges. This prolific seed producer can create extremely dense, impenetrable thickets that crowd out other vegetation and inhibit regeneration of native plants. Associated vegetation of multiflora rose thickets is often limited to a few tree stems which have managed to overtop the rose before the thicket developed. Dense stands of multiflora rose can slow down forest regeneration. Where the species is abundant it can become a dominant component of a forest understory. Anyone who has attempted to traverse a thicket of this plant would have few kind words for it, as its interweaving, abundantly thorned branches snag on clothes and hair and can be quite painful. Large populations are sometimes associated with former plantings, but the plant has naturalized throughout much of the United States and continues to be spread with the help of birds.



Multiflora rose (*Rosa multiflora*)

Illustration From Newcomb's Wildflower Guide, reprinted with permission of Little, Brown and Company (Inc.).

**Distribution:**
Multiflora rose is native to eastern Asia. It was brought to North America in the later part of the nineteenth century to be used in horticultural plantings. Since then it has been widely planted for a variety of reasons, including wildlife food and cover, erosion control, and as a living fence to border properties or pen livestock. Its use was historically advocated by the Soil Conservation Service and by some state conservation departments. Multiflora rose is now naturalized (established and reproducing in the wild) throughout much of the United States. In Maine, it is documented from Oxford, Waldo, and York Counties, but likely occurs in more.

**Control:**
The best method of controlling multiflora rose is to prevent it from becoming established in the first

**This fact sheet was prepared by the Maine Natural Areas Program, #93 State House Station, Augusta, ME, 04333-0093 and was funded through a grant from the Maine Outdoor Heritage Fund.**

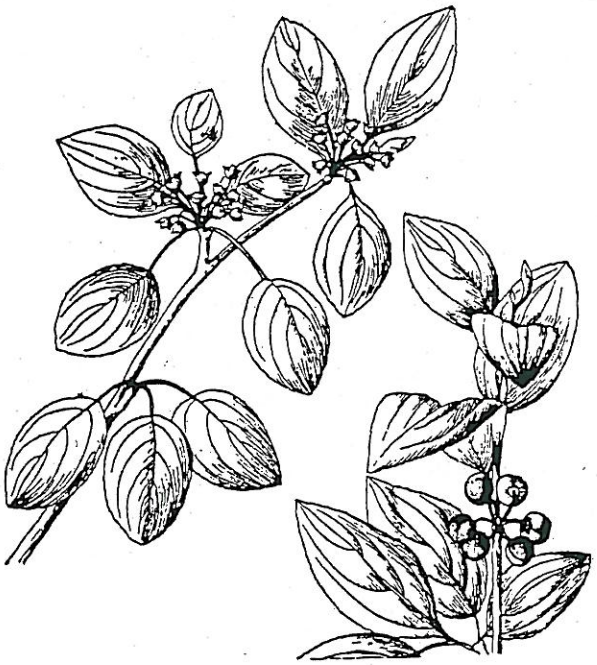
# MAINE INVASIVE PLANT FACT SHEET

## Common Buckthorn and Glossy Buckthorn

*Rhamnus cathartica* and *Frangula alnus*
(Buckthorn Family)

**Description:**
Common buckthorn is a deciduous shrub or small tree that grows up to 20 feet in height. Dull green leaves are oval, edged with fine teeth, and one to two inches long. The leaves have several pairs of distinct veins which are curved toward the leaf tip. Leaf arrangement on the stem is alternate to nearly opposite. Twigs may be tipped with sharp stout thorns. Small clusters of fragrant greenish-yellow flowers, each with four petals, grow from among the leaves. Like common buckthorn, glossy buckthorn is a deciduous shrub or small tree. It can readily be distinguished from common buckthorn by several obvious characters. Glossy buckthorn has similarly shaped leaves, but they are glossy or shiny and lack teeth on their margins. Flowers are also similar, but have five petals on glossy buckthorn. Plants of both species reach seed bearing age quickly and both produce drupes (berries). Care should be taken not to mistake the native alder-leaved buckthorn for these non-natives. Alder-leaved buckthorn can be distinguished from common buckthorn by the lack of thorns at the end of its twigs, and it can be distinguished from glossy buckthorn by the presence of small teeth on its leaves.

**Habitat:**
Potential habitats of common buckthorn are diverse and include open woods, thickets on exposed rocky sites, hedgerows, pastures, and roadsides. It grows in well-drained sand, clay, or poorly drained calcareous soils, but prefers neutral or alkaline soils. It is less vigorous in dense shade. Glossy buckthorn typically inhabits wetter, less shaded sites than common buckthorn. It grows in soils of any texture. Habitats include alder thickets and calcareous or limestone influenced wetlands.



Common buckthorn (*Rhamnus cathartica*)

Illustration from Britton & Browns Illustrated Flora of the Northern United States and Canada, 2nd ed.

**Threats to Native Habitats:**
Although seedlings of both buckthorns invade apparently stable habitats, recruitment is most successful where there is ample light and exposed soil. These buckthorns have long growing seasons, rapid growth rate, and resprout vigorously after being topped. In North America, both species leaf out prior to most woody deciduous plants, and can retain their leaves well into autumn. Buckthorns rapidly form dense, even-aged thickets. The large leaves and continuous canopy create dense shade. Even-aged thickets are common in both wetlands and in woodland understories. Common buckthorn invasion is greatest in thinned or grazed woods, along woodland edges, and in openings created by windfalls. Common buckthorn's tolerance of heavy clay soils, and moist or dry sites increases its success in many types of habitats. Glossy buckthorn sometimes invades similar woodland habitats, but more often invades wetlands that are comparable

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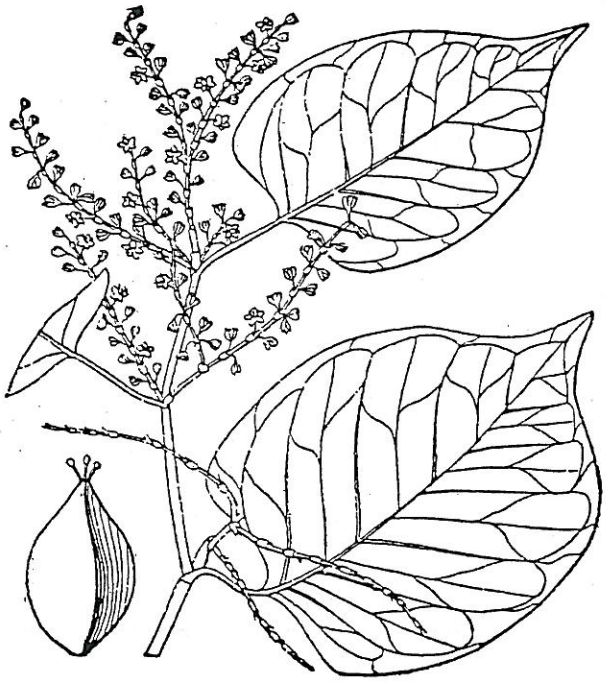
# MAINE INVASIVE PLANT FACT SHEET

## Japanese Knotweed / Mexican Bamboo

*Fallopia japonica*
Synonym: *Polygonum cuspidatum*
(Smartweed Family)

**Description:**
Japanese knotweed is a fast growing easily recognized herbaceous perennial that grows from three to nine feet in height and forms large thickets where it colonizes. The leaves are two to six inches long and broadly oval with somewhat squared bases and pointed tips. It is sometimes referred to as Mexican bamboo because of its large hollow stems. It forms tiny greenish white flowers that grow in linear clusters along the stem. Flowers bloom from August to September and form shiny black-brown three-sided seeds. In autumn, the leaves fall from the stout stems and the chestnut brown stems may remain standing for most of the winter, giving the false impression that the plant is woody. Reproduction is primarily vegetative with new shoots developing off of extensive rhizomes. The plant most likely reaches new sites by transport of rhizome fragments. This plant may be confused with giant knotweed (Fallopia sachalinensis) which has a similar growth form, but is generally taller and has leaves with rounded leaf bases. Giant knotweed is also a non-native species with its origins in Asia. Consult a wildflower field guide or contact a natural resource professional for accurate identification.

**Habitat:**
This plant is most commonly found in moist open habitats such as riverbanks, river islands, disturbed wetlands, along road margins, and in areas with disturbed soils. Many colonies are escaped relicts of historical plantings and are located in or near towns or cities. Colonization of more natural habitats is facilitated by disturbance such as that caused by the scouring action of ice or high waters in rivers and streams.



Japanese Knotweed (*Fallopia japonica*)
Illustration from Britton & Browns Illustrated Flora of the Northern United States and Canada, Dover ed.

**Threats to Native Habitats:**
Japanese knotweed is a robust perennial herb that emerges early in the spring and forms dense thickets up to nine feet in height. Thickets may be so dense that virtually all other plant species are shaded out. Large colonies frequently exist as monocultures, reducing the diversity of plant species and significantly altering natural habitat. Reproduction from rhizomes, even small fragments, enables the plant to be easily transferred to new sites by flowing water and in soil used as fill. Unchecked, this plant can colonize extensively in riparian areas. Once established, it is difficult to remove.

**Distribution:**
Japanese knotweed is native to eastern Asia. It was brought to North America most likely for ornamental plantings in the late nineteenth century.

This fact sheet was prepared by the Maine Natural Areas Program, #93 State House Station, Augusta, ME, 04333-0093 and was funded through a grant from the Maine Outdoor Heritage Fund.

## APPENDIX IV. CONTACT INFORMATION

**Signs:**
Voss Signs, Inc., PO Box 553, Manlius, NY 13104-0553. (800) 473-0698 www.vosssigns.com

**Invasive species:**
Rose Paul, Director of Science & Stewardship. The Nature Conservancy, Montpelier, VT (rpaul@tnc.org, 802 229-4425)

The Nature Conservancy Wildlands Invasives Team Website: http://tncweeds.ucdavis.edu/

**Insects:**
Ross Bell – University of Vermont, Ross.Bell@uvm.edu, (802)656-4349
Jonathan Leonard – University of Vermont, Jonathan.Leonard@uvm.edu, (802) 656-2979

**Birds:**
Mark LaBarr – Audubon Vermont, mlabarr@audubon.org, (802) 434-3068

**Plants:**
David Barrington – University of Vermont, David.Barrington@uvm.edu
Cathy Paris – University of Vermont, Cathy.Paris@uvm.edu
Liz Thompson– University of Vermont, Elizabeth.Thompson@uvm.edu

**Turtles:**
Jim Andrews (also an expert on other reptiles and amphibians) – Middlebury College, jandrews @middlebury.edu
Steve Parren – Vermont Nongame and Natural Heritage Program, VT Fish & Wildlife Dept., Waterbury

**Rare species:**
Everett Marshall, Information Manager, Vermont Nongame and Natural Heritage Program, VT Fish & Wildlife Dept., Waterbury

**Trail improvement material:**
EcoTrack© Tile – a product of Bike Track, Inc. 1 (888) 663-8537, www.biketrack.com

**Intervale Foundation:**
David Lane, (802) 660-0440

**Adjacent landowner:**
Pat Fitzgerald owns the farmland west of the McKenzie Property – 655-3833

## APPENDIX V. SPECIES LISTS

*This list was developed from field observations from September 2002-March 2003. Due to this limited time period and the limitations of our expertise, the lists have many missing pieces: fungi, warblers, mosses, and insects, to name a few. Species in* **bold** *are rare in Vermont.*

**Flora:**

| Scientific name | Common Name | Notes/Rarity rank<br>* non-native<br>** invasive |
|---|---|---|
| **Trees** | | |
| *Acer negundo* | Boxelder | |
| *Acer saccharinium* | Silver maple | |
| *Fraxinus americana* | White ash | |
| *Fraxinus pennsylvanica* | Green ash | |
| *Populus deltoides* | Cottonwood | |
| *Salix nigra* | Black willow | |
| *Ulmus americana* | American elm | |
| | | |
| **Ferns & Clubmosses** | | |
| *Equisetum arvense* | Common horsetail | |
| *Mattecucia struthiopteris* | Ostrich fern | |
| *Onoclea sensibilis* | Sensitive fern | |
| | | |
| **Grasses & Sedges** | | |
| *Andropogon gerardii* | Big bluestem | |
| *Bromus inermis* | Smooth brome | * |
| *Bromus altissimus* | A brome grass | |
| ***Cyperus squarrosus*** (synonym=*C. aristatus*) | **Awned cyperus** | **S3** |
| *Cyperus esculentus* | Yellow cyperus | |
| *Cyperus strigosus* | False cyperus | |
| *Echinochloa muricata* | Barnyard-grass | |
| *Eleocharis erythropoda* | | |
| ***Eleocharis ovata*** | **Ovate spikerush** | **S1** |
| *Elymus canadenis* | | |
| ***Eragrostis hypnoides*** | **Creeping lovegrass** | **S2S3** |
| *Eragrostis pectinacea* | Carolina lovegrass | |
| *Leersia oryzoides* | Rice cut-grass | |
| *Leersia virginica* | White grass | |
| *Muhlenbergia frondosa* | A muhly grass | |
| *Panicum capillare* | Witch-grass | |
| ***Panicum rigidulum*** | **Redtop panicum** | **S3** |
| *Phalaris arundinacea* | Reed canary-grass | |
| | | |
| **Other herbaceous plants** | | |
| *Aegopodium podagraria.* | Goutweed | ** |
| *Amphicarpaea bracteata* | Hog-peanut | |
| *Angelica atropurpurea* | Great angelica | |
| *Arctium lappa* | Giant burdock | * |
| *Arctium minus* | Common burdock | * |

| | | |
|---|---|---|
| *Artemisia vulgaris* | Mugwort | * |
| *Bidens cernua* | Nodding bur marigold | |
| *Bidens frondosa* | Devil's beggar-ticks | |
| *Bidens vulgata* | Tall beggar-ticks | |
| *Calystegia sepium* | Hedge bindweed | |
| *Echinocystis lobata* | Wild cucumber | |
| *Eupatorium maculatum* | Spotted joe-pye weed | |
| *Geum aleppicum* | Yellow avens | |
| *Geum canadense* | White avens | |
| *Gnaphalium uliginosum* | Low cudweed | |
| *Helianthus decapetalus* | Forest sunflower | |
| *Helianthus tuberosus* | Jerusalem-artichoke | * |
| *Heracleum maximum* | Cow parsnip | |
| *Hesperis matronalis* | Dame's rocket | ** |
| *Impatiens capensis* | Pale touch-me-not | |
| *Impatiens pallida* | Spotted touch-me-not | |
| *Laportea canadensis* | Wood nettle | |
| *Lythrum salicaria* | Purple loosestrife | ** |
| *Mimulus ringens* | Monkey flower | |
| *Myriophyllum* sp. | Milfoil | |
| *Plantago major* | Common plantain | |
| *Polygonum amphibium* | Water smartweed | |
| *Polygonum cespitosum* | A smartweed | * |
| *Polygonum cuspidatum* | Japanese knotweed | ** |
| *Polygonum hydropiper* | Water-pepper | |
| *Polygonum lapathifolium* | Nodding smartweed | |
| *Polygonum pennsylvanicum* | Pink knotweed | |
| *Polygonum sagittatum* | Arrow-leaved tearthumb | |
| *Polygonum scandens* | Climbing false buckwheat | |
| *Sagittaria latifolia* | Common arrowhead | |
| ***Scrophularia marilandica*** | **Carpenter's square** | **S3** |
| *Solidago altissima* | Tall goldenrod | |
| *Solidago gigantea* | Late goldenrod | |
| *Tovara virginiana* | Jumpseed | |
| *Urtica doica* | Stinging nettle | * |
| *Urtica procera* | Tall nettle | |
| *Verbena hastata* | Blue vervain | |
| *Viola* sp. | Violet species | |
| *Vitis riparia* | Riverbank grape | |
| *Xanthium strumarium* | Cocklebur | |
| *Zizia aurea* | Golden alexanders | |
| | | |
| **Shrubs** | | |
| *Celtis occidentalis* | Northern hackberry | |
| *Rhamnus cathartica* | Common buckthorn | ** |
| *Rosa multiflora* | Multiflora rose | ** |
| ***Salix exigua*** | **Sandbar willow** | **S3** |
| *Sambucus canadensis* | Common elder | |
| *Sambucus pubens* | Red-berried elder | |
| | | |

**Amphibians & Reptiles: based on observations in 2002-2003; * indicates potential species based on the species' known ranges and habitat requirements.**

| | | |
|---|---|---|
| *Rana pipiens* | Northern leopard frog | |
| *Bufo americanus* | American toad | |
| *Rana sylvatica* | Wood frog* | |
| *Pseudacris crucifer* | Spring peeper* | |
| *Hyla versicolor* | Gray tree frog* | |
| *Ambystoma laterale* | Blue spotted salamander* | S3 |
| *Chelydra serpentine* | Snapping turtle* | |
| *Chrysemys picta picta* | Painted turtle* | |
| *Apalone spinifera* | Spiny softshell turtle* | S1 –Threatened Not seen in the Winooski River recently |
| *Thamnophis sirtalis* | Garter snake | |
| *Thamnophis sauritus* | Ribbon snake* | S2 |
| *Liochlorophis vernalis* | Smooth green snake* | |
| *Lampropeltis triangium* | Milk snake* | |
| *Soreria dekayi* | Northern brown snake* | |
| *Soreria occipitomaculata* | Northern red-bellied snake* | |
| *Diadophis punctatis edwardsii* | Northern ring-necked snake | |

**Mammals: based on winter tracking in 2002-2003; * indicates potential species based on the species' known ranges and habitat requirements and observations from adjacent land.**

| | | |
|---|---|---|
| *Odocoileus virginianus* | White tailed deer | |
| *Castor canadensis* | Beaver | |
| *Mustela vison* | Mink | |
| *Vulpes vulpes* | Red fox | |
| *Sciurus carolinensis* | Gray squirrel | |
| *Lutra canadensis* | Northern river otter* | |
| *Alces alces* | Moose* | |
| *Procyon lotor* | Raccoon* | |
| *Mustela erminea* | Short-tailed weasel* | |
| *Mephitis mephitis* | Striped skunk* | |
| *Didelphis marsupialis* | Opossum* | |
| *Marmota monax* | Woodchuck* | |
| *Tamias striatus* | Eastern chipmunk* | |
| *Glaucomus sabrinus* | Northern flying squirrel* | |
| *Peromyscus maniculatus* | Deer mouse* | |
| *Peromyscus leucopus* | White-footed mouse* | |
| *Microtus pensylvanicus* | Meadow vole* | |
| *Sylvilagus floridans* | Eastern cottontail* | |
| *Martes pennanti* | Fisher* | |
| *Canis latrans* | Coyote* | |
| *Ursus americanus* | Black bear* | |

Birds found at the McKenzie Property from February – April 2003
Observed by: Sherry Berrin, Natural Resource Specialist Winooski Valley Park District

| | | |
|---|---|---|
| Red-breasted Merganser | | |
| Rough-legged Hawk | | |
| Hairy Woodpecker | | |
| American Crow | | |
| Black-capped Chickadee | | |
| Northern Cardinal | | |
| | | |

More bird information will be available from the Vermont Breeding Bird Atlas (5 year program beginning in summer 2003, coordinated by the Vermont Institute of Natural Science)

**Insect list: based on pitfall trapping in September 2002.**

| Scientific name | Common name | Total # captured |
|---|---|---|
| **Forest floor** | 1 trap, 1 day | |
| *Nitidulidae sp.* | Sap beetles | 1 |
| *Pterostichus melanarius* | A ground beetle | 3 |
| | | |
| **Mid beach (deep sand)** | 6 traps, 1 day | |
| *Geopinus incrassatus* | | 54 |
| *Lepidocyrtus paradoxus* | | 1 |
| *Harpalus erraticus* | A ground beetle | 1 |
| *Harpalus pensylvanicus* | A ground beetle | 2 |
| *Harpalus rufipes* | A ground beetle | 1 |
| *Patrobus longicarmis* | | 2 |
| *Nelleria pallipes* | | 1 |
| *Histerids* | | 3 |
| *Phalargid* | | 1 |
| *Anisodactylus santecruces* | | 1 |
| *Cicindella repanda* | Tiger beetle | 42 |
| *Formicidae* Family | Queen ant | 1 |
| *Formicidae* Family | male ants | 2 |
| | | |
| **Water's edge (wet sand)** | 3 traps, 1 day | |
| *Anisodactylus discoideum* | | 1 |
| *Bembidion americanum* | | 4 |
| *Bembidion confusum* | | 73 |
| *Cicindella repanda* | Tiger beetle | 11 |
| *Hymenopteran* | | 1 |
| *Nelleria pallipe* | | 1 |
| *Onophrum americanum* | | 1 |
| *Onophrum tessalatum* | | 1 |
| *Patrobus longicornus* | | 1 |
| *Saldid* sp. | Shore bugs | 3 |
| *Staphylinids* | | 2 |

**Potential bird species nesting on or near the ground on the McKenzie property: based on known species' ranges and habitat requirements.**

| Species | Nest habitat description |
|---|---|
| Veery (thrush) | nests in shrubs, 0'-6' off ground in moist, shaded woodlands with understory |
| Swainson's Thrush | woodlands, riparian thickets, 4'-20', a ground-dwelling bird |
| Gray Catbird | 2'-10' off ground, dense brush bordering woodland swamp or stream, wooded suburbs, forest edge |
| Northern Mockingbird | 3'-10' off ground, habitat generalist, open and partly open habitats, abundant in suburban areas |
| Brown Thrasher | 0'-10' off ground, brush and shrubland, deciduous forest edge and clearings, suburbs |
| Orange-crowned Warbler | Unlikely, deciduous and deciduous/coniferous woodland, riparian woodland, directly on ground |
| Nashville Warbler | on ground of deciduous, coniferous, and riparian woodlands and thickets |
| Yellow Warbler | 1'-14' habitat generalist, wet second growth woodlands, gardens |
| Canada Warbler | 0'-0.5' deciduous woodlands and riparian thickets |
| Common Yellowthroat | 0'-3' in overgrown fields, hedgerow or woodland margin |
| Northern Cardinal | 1'-15' in riparian thickets, dense shrubs, undergrowth, residential areas |
| Indigo Bunting | 1'-15' deciduous forest edge and clearings, open woodland and weedy fields |
| Rufous-sided Towhee | 0'-5' forest edge, riparian thickets, woodlands |
| Song Sparrow | 0'-3' dense veg along watercourses, forest edge, clearings, bogs, and gardens |
| Field Sparrow | 0'-2.5' old fields brush, deciduous forest edge, thorn scrub |
| Chipping Sparrow | 0'-11' forest edge, oak/pine-oak woodland, thickets, parks |
| White-throated Sparrow | in shrub up to 3', mixed forest, edge and clearings, thickets, open woodland |
| American Goldfinch | 1'-3' in weedy, cultivated fields and open deciduous and riparian woodlands |
| American Woodcock | on grounds in moist woodland, mixed forest, meadows, abandoned fields |
| Ring-necked Pheasant | on ground in cultivated areas, woodland, forest edge |
| Mourning Dove | can be on ground in open woodland, agricultural areas with scattered trees, suburbs |
| Common Nighthawk | on ground (prefer sandy soil) in open and semi-open habitats, fields, cities and towns |
| Marsh Wren | Unlikely, nests in large area dominated by reeds |
| Sedge Wren | grass nest, 0'-2' off ground in sedges of wet meadows or dry marshes |
| Golden-winged Warbler | Unlikely (rare in state) but, on ground nest , early successional habitats of old fields |
| Chestnut-sided Warbler | 1'-3' in brushy thickets in open deciduous woodlands and borders |
| Prairie Warbler | 1'-10' in tree or against trunk, dry brushy clearings and forest margins (unlikely) |
| Wilsons Warbler | highly unlikely, rare breeders in VT, 0'-3' in thickets/brush of wet locations, riparian woodlands |
| Louisiana Waterthrush | unlikely, 0'-2' along bank in humid forest with running water |
| Northern Waterthrush | unlikely, 0'-2' along bank in forest with standing or slow moving water |
| Grasshopper Sparrow | on ground in grassland, cultivated fields, and old fields |
| Vesper Sparrow | on ground in old fields, grassland, and woodland clearings |
| Savannah Sparrow | 0'-0.5' in grassland, and cultivated grassy area |
| American Tree Sparrow | 0'-5' in shrub in open areas with scattered trees and brush |
| White Crowned Sparrow | 0'-5' stunted woody vegetation, wet meadows, thickets, gardens, parks |

| | |
|---|---|
| Lincoln's Sparrow | (unlikely) 0'-5' in wet meadows, riparian thickets |
| Swamp Sparrow | on ground or up to 5', emergent vegetation around water, marsh bog, wet meadow |
| Bobolink | on ground, tall grass, flooded meadows, dense grain fields |
| Eastern Meadowlark | on ground in dense cover in fields and grasslands |
| Least Bittern | 0'-3' in emergent vegetation in freshwater |
| American Bittern | on ground in tall emergent vegetation in freshwater (there have been reports of this species in the Intervale in the summer) |
| Canada Goose | usually near water on ground, freshwater and meadows |
| Mallard | flooded fields |
| American Coot | 0'-2'freshwater lakes, ponds, rivers and marshes |
| Killdeer | on ground in fields, meadows, pastures |
| Northern Bobwhite | on ground in tall grassland, brushy fields, open woodland, cultivated fields |

## Rarity Rank Explanation:

State status explanation (from The Vermont Nongame and Natural Heritage Program website):

**Vermont Nongame & Natural Heritage Program**
**Department of Fish and Wildlife**
**Explanation of Legal Status and Information Ranks**

**State Status As per the Vermont Endangered Species Law (10 V.S.A. Chap. 123)**

**E:** Endangered: in immediate danger of becoming extirpated in the state
**T:** Threatened: with high possibility of becoming endangered in the near future

**Information categories only; not established by this law**

**SC:** Special Concern: rare; status should be watched
**PE:** Proposed for endangered
**PT:** Proposed for threatened

**Federal Status As per the Federal Endangered Species Act (P.L. 93-205)**

**LE:** Listed endangered
**LT:** Listed threatened

**NATURAL HERITAGE RANKING Informational categories only; not established by law. Developed by the Science Division of The Nature Conservancy.**

**State Ranks of Plants, Animals, and Natural Communities**

**State ranks are assigned by the Nongame & Natural Heritage Program based on the best available information. Ranks are reviewed annually. For bird species the ranks refer to breeding status only.**

**S1:** Very rare, generally 1 to 5 occurrences believed to be extant and/or some factor(s) making it especially vulnerable to extirpation from the state
**S2:** Rare, generally 6 to 20 occurrences believed to be extant and/or some factor(s) making it vulnerable to extirpation in the state
**S3:** Uncommon, believed to be more than 20 occurrences and/or there is some threat to it in the state
**S4:** Apparently secure in state, often with more than 100 occurrences
**S5:** Demonstrably secure in state

**SA:** Accidental in state
**SE:** An exotic established in state
**SH:** Known from historical records only
**SR:** Reported from the state, but without persuasive documentation
**SRF:** Reported in error but this error persisted in the literature
**SP:** Possible in the state but no reported or documented records
**SSYN:** No longer considered a taxon in the state.
**SZ:** Not of practical conservation concern because there are no definable occurrences
**SX:** Extirpated from the state
**SU:** Status uncertain
**?:** Denotes provisional rank

**Breeding Status** (primarily birds) only for species which have distinct breeding and or nonbreeding populations.

**B:** Breeding status e.g. S1B is a very rare breeder
**N:** Nonbreeding status e.g. S1N is a very rare nonbreeder; and SZN is a migrant that occurs in an irregular, transitory, and/or dispersed manner

# APPENDIX VI. COPY OF DEEDS

WARRANTY DEED

New England Legal Stylky

# Know all Men by these Presents

the JOHN McKENZIE PACKING CO., INC.,
a Vermont Corporation,

Burlington *in the County of* Chittenden
*State of* Vermont *Grantor , in the consideration of*
and More ---------- *Dollars*
to it *full satisfaction by*

the CITY OF BURLINGTON, VERMONT,
a Municipal Corporation, for the benefit of its
Department of Parks and Recreation,

Burlington *in the County of* Chittenden
*State of* Vermont *Grantee , by these presents, do*

give, **Grant, Sell, Convey and Confirm** *unto the said Grantee*

the CITY OF BURLINGTON, VERMONT,
and its successors

~~xxxx~~ ~~xxxx~~ *and assigns forever, a*
*certain piece of land in* Burlington *in the*
*County of* Chittenden *and State of Vermont, described as*
*follows, viz:*

certain parcel of land located in that section of the City of Bur-
ington known as the Intervale, and being a portion only of the same
and premises conveyed to the John McKenzie Packing Company, Inc.
Executor's Deed of the Howard National Bank and Trust Company,
ator of the Last Will and Testament of Edward P. Bostwick, deceased,
Executor's Deed bearing date June 15, 1953 and of record in Volume
Page 399 of the Land Records of the City of Burlington.

ction hereby conveyed is a 63 acre, more or less, parcel of
bounded generally on the north and east by the Winooski River
curves around the parcel and is more specifically described as
ows:

ommencing at a point along the easterly side of the lane
erving as access to the property, said lane being known as
extension of Intervale Road; from said point, turn an
nterior angle of 88°52'20" and proceed along a N 67°34'E
course a distance of 991.29 feet, more or less, to a
oint; from said point, turn an interior angle of 90°34'00"
and proceed along a S 23°00'E course a distance of 1457.21
eet, more or less, passing enroute along an existing fence
erving as a boundary, to a point; from said point continue
long the last-mentioned course a distance of 293.60 feet,
ore or less, to a point, said point being 22 feet, more
less, from the top of the present bank of the Winooski
iver; from said point continue in the last-mentioned course
the thread or midpoint of the Winooski River; thence
roceed in a general easterly and southeasterly direction
long the thread or midpoint of the Winooski River as it

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meanders along the riverfront of the within-conveyed parce
to a point, said point along the thread or midpoint of th
Winooski River constituting an extension of the within-co
parcel; from said point proceed along a course of N 64°19
to a point 17 feet, more or less, from the top of the pres
bank of the Winooski River; from said point continue alon
the last-mentioned course a distance of 510.46 feet, more
less, passing enroute along an existing fence serving as
boundary, to a point; from said point turn an interior ang
of 267°52'40" and proceed along a course of N 23°33'40" W
distance of 596.80 feet, more or less, passing enroute al
an existing fence serving as a boundary, to the point or
of beginning.

The within-conveyed parcel is as set forth in that certain Plan
"PLAN OF LAND TO BE CONVEYED BY JOHN McKENZIE PACKING CO.,
dated August, 1979, by Fred C. Koerner, C.E., revised November
to be recorded in the Land Records of the City of Burlington.

This conveyance is made subject to the lease of a right of way
by said Edward P. Bostwick to the Public Electric Light Compan
erection, construction, maintenance and operation of poles,
lines, conduits, etc., dated March 6, 1941, and of record in Vo
115 at Pages 359-360 of said Land Records.

Also conveyed herewith is an easement or right of way for acc
egress to the within-conveyed parcel along that lane or roadw
serving as an extension of Intervale Road as well as to any p
Intervale Road which may not be formally determined to be pub
ject however to the retention of use of said lane or roadway o
of Intervale Road by the Grantor, its successors and assigns,
the owners of those lands adjacent to said lane or roadway or
of Intervale Road.

Incorporated herein by reference as if recited in full are th
referred-to Executor's Deed, Plan, Lease and instruments rel
Intervale Road and its extension, their records and deeds,
and records therein referred to.

**To have and to hold** *said granted premises, with all the privile*
*purtenances thereof, to the said Grantee,*

the CITY OF BURLINGTON, VERMONT

and its successors ~~heirs~~ *and assigns, to their own use and beha*

*And, the said Grantor,*

the JOHN McKENZIE PACKING CO., INC.,

*for itself and its*
and assigns
~~successors and administrators~~, *do covenant with the said Grantee,*

the CITY OF BURLINGTON, VERMONT
and its successors

~~heirs~~ *and assigns, that until the ensealing of these presents it is*
*the sole owner of the premises, and have good right and title to*
*same in manner aforesaid, that they are* **Free from every encumbr**
save referred to herein

*reby engages*
*hatever,*

**In Witnes**
be set
Twenty
Thomas

**ate of Ver**
RETTENDEN

*onally appea*
free act a

Received for reco

engages to **Warrant and Defend** *the same against all lawful claims*
ver,

**Witness Whereof,** has *hereunto* caused its ~~hand and~~ *seal*
set Twenty Fourth *day of* November *A. D. 19* 80

In Presence of

Thomas J Kenney

D C Whittlesey

JOHN McKENZIE PACKING CO., INC.

By John G. McKenzie (L.S.)
John G. McKenzie,
Its President and
Duly-Authorized Agent

(L.S.)

(L.S.)

(L.S.)

(L.S.)

**te of Vermont,** } ss. *At* Burlington *this*
GRENDEN **County** } 24th *day of* November *A. D. 19* 80,

JOHN McKENZIE PACKING CO., INC.
and John G. McKenzie, Its President and
Duly-Authorized Agent

*nally appeared, and* he *acknowledged this instrument, by*
*sealed and subscribed, to be* his *free act and deed,* and
ee act and deed of said John McKenzie Packing Co., Inc.
*Before me*

Thomas J Kenney
Notary Public

ved for record Nov. 24, 1980, at 3:10 P. M. and recorded.
Attest: H L Wagner
City Clerk

Estate of Edward P. Bostwick

to

John McKenzie Packing Company, Inc.

EXECUTOR'S DEED

To All To Whom These Presents Shall Come: The Howard National Bank and Trust Company, a national banking institution of Burlington in the County of Chittenden and State of Vermont, as Executor of the Last Will and Testament of Edward P. Bostwick, deceased, late of said Burlington, SEND GREETING:

WHEREAS, the Honorable the Probate Court for the District of Chittenden at a session thereof, holden at the Probate Office in Burlington in said District, on the 10th day of April A. D. 1953 on due application in writing, for that purpose, which said application having been duly published according to law, did license and authorize said Howard National Bank and Trust Company, Executor as aforesaid, to sell at public auction or private sale, as being beneficial to the estate and to those interested therein, a part of the real estate of said deceased, situated in said Burlington, to wit: Farm Land, Buildings and Chattels belonging to the decedent thereon, located on Intervale Road;

AND WHEREAS, having previously taken the oath required by law, and fulfilled all the requisites of the Statute, and of the license aforesaid said Howard National Bank and Trust Company, executor as aforesaid, has sold said part of the real estate of said deceased to John McKenzie Packing Company, Inc., a Vermont corporation with principal office and place of business in Burlington in the County of Chittenden and State of Vermont for the sum of Ten and more Dollars.

NOW, KNOW YE, That pursuant to the license and authority aforesaid, and not otherwise, and in consideration of the said sum of Ten and more Dollars, the receipt whereof, it does hereby acknowledge, does by these presents, grant, bargain, sell, convey and confirm unto the said John McKenzie Packing Company, Inc., its successors and assigns, the following described pieces and parcels of land in Burlington in the County of Chittenden and State of Vermont, described as follows, viz:

1. All and the same land and premises consisting of about sixty-five (65) acres, more or less, with all buildings thereon which were conveyed to said Edward P. Bostwick by Quit-Claim Deed of Lucius A. Bostwick, dated December 4, 1918, of record in Vol. 70, Page 161, of the Land Records of the City of Burlington. Being all and the same land and premises which were conveyed to said Edward P. and Lucius A. Bostwick by the following two deeds: (A) Administrator's Deed of Grant Thomas, Administrator of the Estate of Harry R. Thomas, deceased, dated April 21, 1915, of record in Vol. 67, Page 215, of said Land Records, and (B) Quit Claim Deed of said Grant Thomas, Administrator of the Estate of said Harry R. Thomas, deceased, dated April 21, 1915, of record in Vol. 59, Page 508, of said Land Records.

2. All and the same parcel of land consisting of eighteen (18) acres, more or less, situated on the easterly side of Intervale Road, so-called, which was conveyed to said Edward P. Bostwick by two deeds as follows: (A) Warranty Deed of Lottie Mead Harrington, dated April 24, 1919, of record in Vol. 72, Page 199, of said Land Records, and (B) Executor's Deed of William B. Lund, executor of the Last Will and Testament of William Mead, deceased, dated March 31, 1919, of record in Vol. 67, Page 348, of said Land Records.

3. All and the same lot of land which was conveyed to said Edward P. Bostwick by Warranty Deed of Frances Hall Sparhawk, individually and as guardian of Norman Fiske Sparhawk, dated December 22, 1926, of record in Vol. 90, Page 199, of said Land Records, and which was conveyed to the estate of Edward P. Bostwick, Howard National Bank and Trust Company, Executor, by said Norman Fiske Sparhawk by his Quit-Claim Deed dated May 29th, 1953, and recorded in Vol. 130, Page 472 of said Land Records.

The premises herein conveyed are all of the land and premises owned by said Edward P. Bostwick which were located on the Intervale, so-called, in said Burlington.

This conveyance is made subject to the lease of a right of way granted by said Edward P. Bostwick to the Public Electric Light Company for erection, construction, maintenance and operation of poles, transmission lines, conduits, etc., dated March 6, 1941, of record in Vol. 115, Pages 359--360 of said Land Records.

Reference is made to the deeds and lease aforesaid and to their records and to the deeds therein mentioned in aid of this description.

It is understood and agreed that the taxes on the within conveyed premises will be prorated as of the date of this conveyance.

To Have and to Hold the said premises, with all the privileges and appurtenances thereof, to the said John McKenzie Packing Company, Inc., its successors and assigns, to it and their own use. And the said Howard National Bank and Trust Company, executor as aforesaid, does covenant with the John McKenzie Packing Company, Inc., its successors and assigns, that the said Edward P. Bostwick died seized of the granted premises, that it is duly authorized by the Court aforesaid to convey the same to the said John McKenzie Packing Company, Inc., in manner and form aforesaid, that it has in all things observed the direction of the law, and the license aforesaid, in the sale aforesaid; that it will, and its successors shall Warrant and Defend said premises against all persons claiming the same, by, from or under the said Edward P. Bostwick or it, the said Howard National Bank and Trust Company, the said executor, but against no other person.

In Witness Whereof the Howard National Bank and Trust Company, executor of the Last Will and Testament of Edward P. Bostwick, deceased, has caused these presents to be executed on its behalf by William M. Lockwood, President, and H. F. Ordway, Vice-President, its Agents, thereunto by vote duly authorized this 15th day of June, A. D. 1953.

In Presence of:

E. H. Bishop

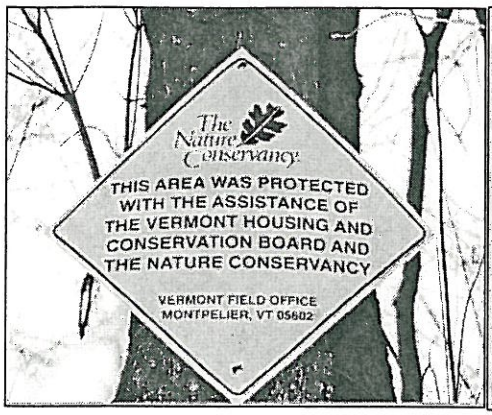
E. C. Paradee

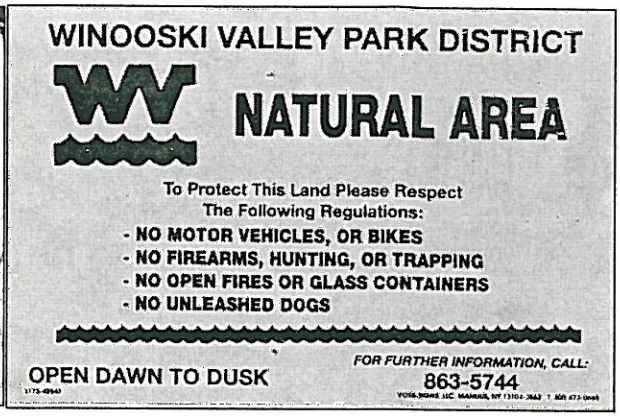
HOWARD NATIONAL BANK AND TRUST COMPANY, (SEAL)
Executor of the Last Will and Testament of
Edward P. Bostwick, Deceased

By: William M. Lockwood (Seal)
William M. Lockwood, President

And H. F. Ordway (Seal)
H. F. Ordway, Vice-President

# APPENDIX VII. SAMPLE OF NATURAL AREAS BOUNDARY SIGNS



## APPENDIX VIII. CD CONTENTS

- Final report and appendices
- Photos of the property
- ArcView projects and themes used to create the maps in the report